Unlocking the Science of Emotions through Pattern Recognition: Establishing Emotions as a Proper Field of Study

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This study investigates the hypothesis that emotions are expressions of the combinatorial code language of internal representation for the mind. It suggests that emotions are a result of pattern recognition outputs of the nervous system, and Expert-AI, an expert system used in diagnosing 225 different eye diseases, serves as the background for the proposed views. The paper proposes that combinatorial memories in nerve cell axon hillocks may use pattern recognition through an algorithmic search process. The nervous system is suggested to function under a combinatorial recognition model that enables the retention and recall of complex memories, rather than the conventional linear summation model. The study explores the historical view of emotions, the various patterns of emotions, and the behaviors triggered by emotions through pattern recognition. It hypothesizes that human emotions are the result of massive memory and pattern recognition capabilities of the nervous system, with emotions as expressions of the common combinatorial code language of internal representation.

Methodology

The methodology of this study aims to demonstrate that emotions are expressions of the common combinatorial code language of internal representation for the outputs of the nervous system. To achieve this objective, the author incorporates relevant material from a previous paper (Abraham, 2023), which explored the view of the mind as a pattern recognition entity. The author updates and contextualizes this material to fit seamlessly with the current paper's narrative and arguments. Proper citation and attribution of the earlier work have been ensured, and ethical and legal standards have been met. The author believes that the included material will contribute to establishing a foundation and context for this paper on emotions. The author provides a historical view of emotions and uses a variety of methods and evidence to support the argument that emotions are expressions of the common combinatorial code (Hormann, 2020) language of internal representation for the nervous system. This study employs a fresh perspective to explore this elusive and fascinating aspect of human cognition. Through a rigorous analysis of available evidence, the author aims to provide a deeper understanding of the relationship between pattern recognition and emotions, ultimately contributing to establishing emotions as a proper field for scientific study.

Objective

The objective of this paper is to establish the field of emotions as a specific area of scientific enquiry that is focused on investigating and understanding the mysterious phenomenon. Scientific fields of study cover a broad range of topics, from the study of subatomic particles to the behavior of complex biological systems. The field of study of emotions needs to be characterized by a set of fundamental principles, concepts, and methods that are used to investigate and understand the phenomenon. These principles and methods need to be based on empirical observation, experimentation, and analysis, and must be subject to continuous refinement and modification as new discoveries are made. The study must be based on the scientific method, which is a systematic approach to investigating phenomena through observation, hypothesis testing, and data analysis. This scientific field of study is essential to our understanding of the human mind. The field can provide us with a systematic approach to investigating and understanding emotions, and they must be based on rigorous principles, concepts, and methods that are subject to continuous refinement and improvement. Through such research, we can make new discoveries and develop innovative technologies concerning the mind that have the potential to transform our world.

Extract From The Earlier Paper On Intuition

The following section on intuition is taken from an earlier paper (Abraham, 2023), by the author, which explored the theme of intuition in more depth.

Expert System History

Expert systems, also known as knowledge-based systems, are computer programs that mimic the decision-making abilities of a human expert in a specific domain (Chu HC, 2008). The development of expert systems can be traced back to the 1950s and 1960s, when computer scientists and artificial intelligence researchers first began to explore the idea of creating machines that could mimic human intelligence. In the early days of expert system development, the primary focus was on developing rule-based systems that could make decisions based on a set of pre-determined rules. These systems were designed to take the place of human experts in tasks such as medical diagnosis and engineering design. During the 1970s and 1980s, expert systems began to gain widespread attention and were seen as one of the most promising applications of artificial intelligence. Companies such as Digital Equipment Corporation (DEC) and International Business Machines (IBM) began to develop and market expert systems, and the field of artificial intelligence grew rapidly. By the 1990s, expert systems (Holman, 1987) had become widely used in many different industries, including healthcare, finance, and manufacturing.

Expert systems aim to provide solutions to problems within specific domains. The developers of these systems gather relevant information related to the domain in question. In the medical field, diseases are the source of problems, which exhibit specific symptoms. The expert system enables users to input their symptoms through answering questions, and it provides data about the possible diagnoses. The system employs an inference engine that connects the symptoms to the knowledge base of diseases using rules, decision trees, or frames. The rules can be expressed as "if-then" statements, which state that if a certain condition is present, then a disease can be diagnosed, and appropriate actions can be taken. The decision tree starts at the root node and follows the branches to determine the final diagnosis, which is represented by a leaf node. Frames (Edwards M, 1987), on the other hand, describe complex relationships that lead to the diagnosis and subsequent treatment of a disease.

Expert-AI - A New Expert System

Expert-AI is a tool designed to diagnose Eye Diseases. It evaluates 225 Eye Diseases and 36 questions to deliver logical answers to the users. In 1990, the ES was presented to a panel of doctors at Vijaya Eye Foundation in Chennai, which treats over 30,000 patients annually. After receiving about 6 responses from the panel to the presented questions, the ES responded with "The Likely Disease Is Angular Conjunctivitis." The doctors were impressed by the ES, which did not ask any "stupid questions" and was faster and more efficient than traditional expert systems. Expert-AI is a tool that leverages a publicly available database of diseases to diagnose a patient's condition based on their reported symptoms. The system stores the relationships between symptoms and diseases and eliminates any diseases that have no connections to the reported symptoms. If a disease has links to all of the symptoms, it is considered the diagnosis. If not, Expert-AI reports that the symptoms do not match any known disease in its database. The frames within the system suggest treatments for the diagnosed disease.

Expert-AI operates on the entire database, making use of general questions to eliminate the possibility of a disease. For instance, 36 questions between them can logically eliminate all 225 eye diseases. If the reported symptoms do not match any of the remaining diseases, Expert-AI reports that it cannot determine a diagnosis. The user of Expert-AI is presented with a sequence of questions with 3 ("Yes" (Y), "Maybe" (U), or "No" (N)) possible response buttons. Y means a positive link - the symptom is always present in the disease. U means the symptom is sometimes present. And N means the symptom is absent for the disease. After each answer to a presented symptom question, the Expert-AI tests the Y/U/N relationships of all diseases in a single step, in manner similar to the way all cells in a spreadsheet are instantly recalculated.

The Y/U/N relationships are entered specifically for their negative impact. An "Yes" answer eliminates all "N" diseases. If the problem is unilateral, all bilateral eye diseases are eliminated. A "No" answer eliminates all "Y" diseases. If visual acuity is not affected, all eye diseases which impact on visual acuity are eliminated. The Expert-AI also purges questions which have "Y' relationships only to eliminated diseases. The questioning process begins with the question which has the maximum number of "Y" relationships. It ends when the presented symptoms eliminate all but a single disease. Specific questions can then confirm the diagnosis. If all diseases are eliminated, the conclusion is that the presented symptoms do not match any disease in the database. For Expert-AI, it is an unknown disease.

Advantages Of Expert-AI

AVOIDANCE OF STUPID QUESTIONS

Expert-AI eliminates the occurrence of "stupid questions" by implementing a more efficient and holistic approach to search. Unlike traditional search algorithms (Casselli RJ, 1991) that look for a single disease to match a symptom, Expert-AI evaluates the entire database in relation to the current answer. This enables Expert-AI to narrow the search faster and effectively eliminate any possibilities that have been ruled out by previous answers. For example, if a patient reports a lack of pain, asking a subsequent question about a disease that always presents with intense pain would be considered a "stupid question" and can be frustrating for the user. To correct this limitation, Expert-AI purges all questions that only relate to diseases that have already been eliminated, thereby avoiding "stupid questions."

LIGHTNING FAST RESPONSES

Expert-AI offers lightning-fast logical recognition. Its ability to eliminate diseases is particularly impressive in special situations. The system has stored the relationships between diseases and symptoms in its memory, enabling it to recognize a specific condition instantly. If only one disease has a positive relationship with a unique symptom, a "Yes" response to this symptom eliminates all other diseases, leading to immediate recognition. The process is based on logic, as it evaluates all diseases in the database against a single symptom. A doctor may walk into a surgery and instantly identify a heart attack in a patient with just minimal visual cues, recognizing a single pattern among many others in a fraction of a second. This demonstrates Expert-AI's capability of providing instant recognition through logical evaluation of its vast database.

LOGICAL DEDUCTION

Expert-AI operates on a logical principle that states if an individual does not exhibit certain symptoms, it can be inferred that they do not have the corresponding disease. This approach utilizes deductive reasoning (Johnson-Laird, 2010) where a specific conclusion is drawn based on a widely accepted principle. For example, if it is established that all men are mortal and a specific individual, Socrates, is identified as a man, it can be logically deduced that Socrates is mortal. On the other hand, inductive reasoning involves using specific observations to arrive at a general conclusion. For instance, the frequent observation of white swans led to the conclusion that all swans are white. However, inductive reasoning is never absolute and is subject to revision with new evidence. A single black swan will disprove the "white swan" conclusion. The scientific process involves continuous induction and falsification, leading to the progression of knowledge and understanding. In conclusion, Expert-AI follows a logical deductive reasoning approach in its diagnostic process, utilizing established principles to draw specific conclusions.

SOLVES PROBLEM OF INTERNAL REPRESENTATION

The challenge of internal representation (Moser EI, 2008) in Expert-AI arises from the difficulty in understanding how the mind processes a vast amount of information. To address this, each problem in AI must be translated into a specialized language and then coded in a way that can be understood by a computer. However, these languages are compartmentalized and only suitable for specific problem-solving tasks, such as chess or disease diagnosis. This compartmentalization leads to the limitation that different problem-solving approaches in AI cannot communicate with each other. Despite these challenges, the mind uses an internal language that can handle a wide range of problems. However, recognizing patterns in a computer environment is a complex task as all objects and events in our environment have multiple overlapping qualities that form trillions of patterns. This is where pattern recognition algorithms come in, attempting to establish the identity of a seen pattern through a logical sequence of steps. By representing all patterns as data items in its database, Expert-AI overcomes the challenge of internal representation due to the limitations of specialized languages used in AI problem-solving. However, it utilizes pattern recognition algorithms to establish the identity of seen patterns and overcome these limitations.

SOLVES PROBLEM OF THE LACK OF AN EXACT MATCH

The problem of finding an exact match in Expert-AI is a complex challenge. The current AI algorithms rely on matching the characteristics of a known pattern strictly with those of a new pattern. These known patterns are stored in the memory of computers for recall. However, this method of identification becomes challenging in cases like face recognition (Rapcsak, 2019) where there are billions of faces in the world and each face has thousands of common features that overlap each other on a virtually infinite scale. People change their appearances due to aging, moods, and the effects of light and shade, making it impossible to find an exact match even when patterns are matched at a microscopic level of detail. In such an environment, Expert-AI utilizes algorithms that can establish the identity of a pattern based on its unique characteristics, taking into account the complexities caused by the shifting characteristics of patterns. In conclusion, the problem of finding an exact match in AI is a complex challenge due to the infinite variability of patterns. Expert-AI overcomes this challenge through algorithms that can establish the identity of a pattern based on its unique characteristics.

HANDLES UNCERTAINTY

The challenge of uncertainty (Pamare C, 2-19) is a major obstacle in AI. Traditional computer systems use binary logic, where a characteristic is either associated with a pattern or it isn't, and a pattern can be either accepted or rejected based on this criteria. However, the relationships between characteristics and patterns are often uncertain and vague, with some characteristics only present sometimes. Fuzzy logic (Vyas S, 2022) tries to tackle this uncertainty by assigning grades to characteristics, such as short, medium height, tall, and very tall. But this approach falls short in handling identification in situations where a person sometimes wears glasses. A computer can match "wears glasses" or "does not wear glasses", but not both at the same time, due to the variable and uncertain nature of most patterns. Expert-AI effectively manages the uncertainty problem by eliminating unmistakable objects and retaining uncertain objects, and then using a series of questions to eliminate the remaining possibilities, making it a more robust and effective solution for AI applications.

IDENTIFIES CONTEXT

Identifying context (Madan CR, 2021) is a challenge in AI that has long been a source of frustration for researchers. When an AI program performs machine translation, it must store contextual information and retrieve it through a search process. However, finding the correct context can be like finding a needle in a haystack, as the mind instantly recognizes the context of every object or event it encounters, drawing on a lifetime of memories and associations. This is in contrast to computers, which must systematically search memory by comparing one characteristic of an object with the characteristics of items stored in memory. The search space is vast, and systematic searches can be hampered by the problem of where to begin and the direction of the search. To help address this issue, AI researchers have developed heuristics (Whelehan DF, 2020), a method for determining the direction of the search. For example, if one is searching for a needle on the beach, heuristics might suggest starting the search to the North. However, this approach only works in small search spaces, and even with the use of heuristics, all search algorithms eventually face the problem of combinatorial explosion. Expert-AI manages the problem of identifying context by eliminating positively unrecognizable objects and retaining uncertain objects. It also deals with the entire database and retains context in the search space, making it a robust and effective solution for AI applications.

ACTS LIKE A PARALLEL PROCESSOR

Expert-AI can be thought of as a parallel processor (Rabani M, 2021), similar to a spreadsheet. When a single entry in a cell is changed, the spreadsheet recalculates every related cell, resulting in the appearance of thousands of serial calculations as a single parallel calculation. With a powerful processor, even spreadsheets with billions of cells can provide this parallel processing effect. Similarly, Expert-AI evaluates the results of a single answer on all the diseases in its database, allowing it to imitate parallel processing and be holistic in nature.

Expert-AI Evaluated The Diseases Of The Eye

Diseases of the Lids
- Squamous Blepharitis
- Ulcerative Blepharitis
- Hordeolum Externum or Stye
- Hordeolum Internum
- Chalazion
- Trichiasis
- Entropion
- Ectropion
- Ptosis
- Symblepharon

Diseases of the Lacrimal Apparatus
- Ephiphora
- Acute Dacryoadenitis
- Chronic Dacryocystitis
- Acute Dacryocystitis

Diseases of the Conjuctiva
- Acute Muco-purulent Conjunctivitis
- Gonococcal Conjunctivitis of Adults
- Opthalmia Neonatorum
- Acute Membranous Conjunctivitis
- Pseudo-membranous Conjunctivitis
- Chronic Conjunctivitis
- Angular Conjunctivitis
- Folicular Conjunctivitis
- Trachoma
- Phlyctenular Conjunctivitis
- Simple Allergic Conjunctivitis
- Vernal Conjunctivitis (Spring Catarrh)
- Tuberculosis of Conjunctiva
- Conjunctival Concretions (Lithiasis)
- Pinguecula
- Pterygium
- Pseudo Pterygium
- Argyrosis
- Xerosis of Conjunctiva (Xeropthalmia)

Diseases of the Cornea
- Purulent Keratitis or Corneal Ulcer
- Hypopyon Ulcer (Ulcus Serpens)
- Mycotic Ulcer
- Mooren's Ulcer (Chronic SerpiginousUlcer)
- Catarrhal Ulcer
- Atheromatous Ulcer
- Keratitis e Lagopthalmo (Exposure Keratitis)
- Neuroparalytic Keratitis
- Herpes Febrilis
- Herpes Zoster Opthalmicus
- Epidemic Kerato-conjunctivitis (E.K.C)
- Phlyctenular Keratitis
- Rosacea Keratitis
- Interstitial Keratitis (Parenchymatous Keratitis)
- Syphilitic Interstitial Keratitis
- Keratitis Profunda
- Disciform Keratitis
- Sclerosing Keratitis
- Arcus Senilis
- Arcus Juvenilis
- Opacities of the Cornea
- Keratoconus
- Keratoglobus
- Anterior Staphyloma

Diseases of the Sclera
- Inflamed Pinguecula
- Episcleritis
- Scleritis
- Ciliary Staphyloma
- Equatorial Staphyloma
- Posterior Staphyloma
- Blue Sclerotic

Diseases of the Iris
- SyphiliticIritis – Congenital Syphilis
- SyphiliticSimple Plastic Iritis – Acquired Syphilis
- SyphiliticGummatous Iritis – Acquired Syphilis
- Gonorrhoeal Iritis
- Tuberculous Plastic Iritis
- Tuberculous Granulomatous Iritis – Miliary Form
- Tuberculous Granulomatous Iritis – Conglomerate Tubercle
- Diabetic Iritis
- Allergic Iritis
- Granulomatous Nodules
- Leprotic Nodules
- Melanoma Nodules
- Sarcoid Nodules
- SyphiliticNodules
- Tuberculous Nodules

Diseases of the Ciliary Body
- Acute Cyclitis- Serous Type
- Acute Cyclitis- Plastic Type
- Chronic Cyclitis (Iridocyclitis)
- Purulent Iridocyclitis (Panopthalmitis)
- Sympathetic Opthalmitis

Glaucoma
- Narrow Angle Glaucoma – Prodromal Stage
- Narrow Angle Glaucoma – Acute Congestive Stage
- Narrow Angle Glaucoma – Chronic Congestive Stage
- Narrow Angle Glaucoma – Stage of Absolute Glaucoma
- Chronic Simple Glaucoma
- Epidemic Dropsy Glaucoma
- Congenital Glaucoma (Bupthalmos)
- Aphakic Glaucoma – Prodromal Stage

Errors of Refraction
- Simple Myopia
- Hypermetropia
- Progressive Malignant Myopia
- Progressive Myopia
- Astigmatism
- Presbyopia
- Anisometropia
- Congenital Myopia

Diseases of the Nervous System – Ocular Signs
- Intra-cranial Aneurysms
- Disseminated Sclerosis
- Nuromyelitis Optica (Devic's Disease)
- Migraine
- Myasthenia Gravis

Diseases of the Lens
- Nuclear Cataract
- Cortical Cataract – Incipient Stage
- Cortical Cataract – Intumescent Stage
- Cortical Cataract – Mature Stage
- Cortical Cataract – Hypermature Stage
- Aphakia
- Congenital Punctate Cataract
- Congenital Posterior Capsular Cataract
- Congenital Embryonal Nuclear Cataract
- Congenital Fusiform or Coralliform Cataract
- Congenital Anterior Capsular Cataract
- Congenital Coronary Cataract
- Lamellar or Zonular Cataract
- After Cataract
- Traumatic Cataract – Contusion Injury
- Traumatic Cataract – Perforating Injury
- Complicated Cataract
- Dislocation of Lens
- Cataract Glaucoma

Diseases of the Vitreous Humour
- Vitreous Opacity – Muscae Volitantes
- Vitreous Opacity – Asteroid Bodies
- Vitreous Opacity – Degenerative Changes
- Vitreous Opacity – Synchisis Scintillans
- Vitreous Opacity – Secondary Eye Problem
- Vitreous Haemorrhage
- Vitreous Haemorrhage – Retinitis Proliferans
- Vitreous Abcess

Diseases of the Eye-Ball
- Corneal Wounds
- Scleral Wounds
- Intra-ocular Foreign Body

Diseases of the Choroid
- Coloboma of the Choroid
- Albinism
- Acute Non-suppurative Choroiditis
- Suppurative Choroiditis – Endopthalmitis
- Tubercles of the Choroid
- Choroidal Sclerosis
- Senile Macular Degeneration
- Disciform Degeneration of the Macula
- Choroidal Haemorrhage
- Choroidal Rupture
- Choroidal Degeneration – Colloid Bodies or Drusens

Diseases of the Retina
- Retinitis
- Pre-retinal Haemorrhage
- Intra-retinal Haemorrhage
- Occlusion of Central Retinal Artery
- Retinal Arteriosclerosis
- Thrombhosis of the Retinal Vein
- Arteriosclerotic Retinopathy
- Renal Retinopathy
- Malignant Hypertensive Retinopathy
- Diabetic Retinopathy
- Retinopathy in Toxemia of Pregnancy
- Periphlebitis Retinae
- Retinitis Pigmentosa
- Detachment of Retina
- Contusion of Retina – (Commotio Retinae)
- Retinal Tear
- Solar Retinopathy – (Eclipse Blindness)

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- Retinal Tear
- Solar Retinopathy – (Eclipse Blindness)

Diseases of the Optic Nerve
- Papilloedema (Choked Disc)
- Papillitis
- Acute Retro-bulbar Neuritis
- Chronic Retro-bulbar Neuritis (Toxic Amblyopia)
- Primary Optic Atrophy
- Secondary Optic Atrophy

Intra-Ocular Tumours
- Retinoblastoma – Quiescent Stage
- Retinoblastoma – Stage of Glaucoma
- Retinoblastoma – Stage of Extra-ocular Extension
- Retinoblastoma – Stage of Metastasis
- Sarcoma of the Choroid - Quiescent Stage
- Sarcoma of the Choroid - Stage of Glaucoma
- Sarcoma of the Choroid - Stage of Extra-ocular Extension
- Sarcoma of the Choroid - Stage of Metastasis

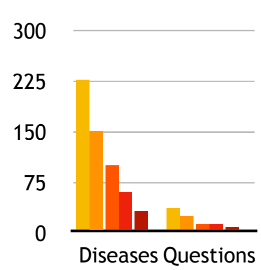
Diseases of the Orbit
- Periostitis
- Orbital Cellulitis
- Cavernous Sinus Thrombosis
- Tenonitis
- Tumours of the Orbit
- Tumours of the Orbit – Optic Nerve

Strabismus or Squint
- Paralytic Squint
- Heterophoria or Latent Squint
- Concomitant Squint

Endocrine Disorders – Ocular Signs
- Thyroid Gland Deficient Secretion
- Thyroid Gland Excessive Secretion
- Thyrotropic Exopthalmos

Other Diseases of the Eye
- Siderosis Bulbi
- Unilateral Proptosis
- Homonymous Hemanopia
- Adherent Leucoma
- Coloboma of the Iris
- Iridodialysis
- Bitot's Spots
- Pseudo-Glioma
- Iridodonesis
- Pthisis Bulbi
- Internal Opthalmoplegia
- Anterior Synechia
- Argyll-Robertson Pupil
- Subconjunctival Haemorrhage
- Cystoid Cicatrix
- Colour Blindness
- Epicanthus
- External Opthalmoplegia
- Night Blindness or Nyctalopia
- Nystagmus
- Opaque Nerve Fibres

The questioning process eliminates both Diseases and Questions



The Questions Presented To The User Of Expert AI

T1 Has the disease affected the visual acuity of the patient?
The Acuity of Vision - The functional examination of the eye requires testing of the acuity of the forms of visual perception - light sense, colour sense
and form sense. Each eye must be tested separately.
T2. Has the disease caused physical discomfort to the patient?
Physical Discomfort - Photophobia, watering, headache, neuralgic pain, itching, irritation, foreign body sensation.
T3 Is pain a symptom of the disease?
Help the Search Process - The reasoning process requires your active co-operation to identify likely possibilities. Do not present signs or symptoms of more than one disease. Please ignore any irrelevant problems which you suspect may also be present.
T4 Are there any signs of the disease in the posterior segment of the eye?
Examination of the Posterior Segment - Examination carried out with the help of an opthalmoscope, at various levels of magnification.
T5 Has the Disease affected both the eyes?
Help the Search Process - The reasoning process requires your active co-operation to identify likely possibilities. Do not present signs or symptoms of more than one disease. Please ignore any irrelevant problems which you suspect may also be present.
T6 Has the disease affected the conjunctiva?
The Conjunctiva - The conjunctiva consists of a mucous membrane, which covers the sclera and is reflected from its surface on to the eyelids. The conjunctival sac may be examined by exposing the palpebral conjunctiva and the fornices.
T7 Has the disease affected the patient's eyelids?
Help the Search Process - The reasoning process requires your active co-operation to identify likely possibilities. Do not present signs or symptoms of more than one disease. Please ignore any irrelevant problems which you suspect may also be present.
T8 Has the disease caused any inflammation?
Help the Search Process - The reasoning process requires your active co-operation to identify likely possibilities. Do not present signs or symptoms of more than one disease. Please ignore any irrelevant problems which you suspect may also be present.
T9 Are there any swellings in the region of the eye?
Swellings can be on the eyelids, lacrimal regions, or be oedema of the retina, proptosis or periorbital oedema.
T9 Does the patient fall into any of the age groups listed below ?
The patient is an infant.
The patient is of schoolgoing age.
The patient is elderly.
None of the above age groups.
T10 Has the disease affected the iris?
The Iris - Colour, thickness, radial pattern, relative movements, etc.
T11 Has the disease affected the pupil?
Help the Search Process - The reasoning process requires your active co-operation to identify likely possibilities. Do not present signs or symptoms of more than one disease. Please ignore any irrelevant problems which you suspect may also be present.
T12 Is Intra-ocular pressure above or below normal limits?
The intra-ocular pressure can be assessed roughly by palpating the sclera. It can also be recorded more accurately with the Schioz tonometer.
T13 Is fever a direct consequence of the disease?
Help the Search Process - The reasoning process requires your active co-operation to identify likely possibilities. Do not present signs or symptoms of more than one disease. Please ignore any irrelevant problems which you suspect may also be present.
T14 Has the disease reduced the patient's corneal sensation?
Corneal Sensation - Usually tested by touching the cornea with a piece of cotton wool.
T15 Is there any neovascularization or vascularized growths in the eye?
Help the Search Process - The reasoning process requires your active co-operation to identify likely possibilities. Do not present signs or symptoms of more than one disease. Please ignore any irrelevant problems which you suspect may also be present.
T16 Has the disease affected the Distant/Near Vision Acuity of the patient?
Distant/Near Visual Acuity - Dimness of vision, blurring of vision, colour blindness, night blindness and double vision are NOT referred to in this question.
T17 Are there any signs of the disease on the optic disc?
The optic disc requires examination in detail. To see the disc, the patient is asked to look straight ahead and the examiner rotates the opthalmoscope slightly temporally.
T18 Are there any signs of the disease on the retina?
The retina consists of the layers formed by three strata of cells and their synapses - the external visual cells, a relay layer of bi-polar cells and a layer of ganglion cells which run into the central nervous system.
T19 Are there any signs of the disease in the macula?
The Macula - About 3 mm to the temporal side of the optic disc is fovea centralis, the most sensitive part of the retina. It is surrounded by a small area called the macula lutea, or yellow spot. There are no blood vessels in the retina at the macula.

T20 Has the disease produced any changes in the vitreous humour?
Vitreous Humour - An inert, jelly-like structure which subserves optical functions. It has the properties of a hydrohilic gel, possesses no blood vessels in postnatal life and is incapable of becoming inflamed.

T21 Are there any ulcers in the eye?
Help the Search Process - The reasoning process requires your active co-operation to identify likely possibilities. Do not present signs or symptoms of more than one disease. Please ignore any irrelevant problems which you suspect may also be present.
T22 Could any of the problems listed below be associated with the disease?
List of Diseases - Diabetes, Tuberculosis, Syphilis or Gonorrhoea.
T23 Could an injury or an operation on the eye have caused the problem?
Injuries to or Operation on the Eye - The eye is protected from direct injury by the projecting margins of the orbit and the eyelids. But, injuries can be caused by foreign bodies, the action of caustics, contusions and wounds. Operations can also leave after effects.
T24 Has the disease affected the lens?
The lens is a biconvex mass of differentiated epithelium, which grows by proliferation of the peripheral cells. The central nucleus consists of the oldest cells and the periphery of the youngest.
T25 Has the disease affected the fornices?
The Fornices - The folds uniting the palpebral and the bulbar conjunctiva are the fornices. The lower fornix is exposed by drawing down the lower lid while the patient looks towards the ceiling. Examination of the upper fornix usually requires the use of a retractor following local anaesthesia.
T26 Has the disease affected the cornea?
The cornea is the transparent anterior part of the dense imperfectly elastic membrane supporting the globe. It consists of the epithelium, the stroma and Descemet's membrane with its endothelium.
T27 Are there any abnormal spots or patches in any region of the eye?
Spots or Patches - Please exclude nodules, corneal opacities, inflammation.
T28 Has the disease affected the lacrimal apparatus?
Help the Search Process - The reasoning process requires your active co-operation to identify likely possibilities. Do not present signs or symptoms of more than one disease. Please ignore any irrelevant problems which you suspect may also be present.
T29 Has the disease caused any membrane formation?
Help the Search Process - The reasoning process requires your active co-operation to identify likely possibilities. Do not present signs or symptoms of more than one disease. Please ignore any irrelevant problems which you suspect may also be present.
T30 Has the disease distorted the eyeball or caused proptosis?
The Eyeball - Even while inspecting individual structures, the eyeball as a whole requires consideration.
T31 Has the disease produced nodules in any region of the eye?
Help the Search Process - The reasoning process requires your active co-operation to identify likely possibilities. Do not present signs or symptoms of more than one disease. Please ignore any irrelevant problems which you suspect may also be present.
T32 Has the Disease affected the patient's Central Field of Vision?
This Question refers to the patient's Central Field of Vision as compared to the the general field of vision. The question does not refer to near/distant vision, colour or night vision, blurring of vision, double vision, or vision distortion.
T33 Are opacities in the lens a sign of the disease?
Opacities in the Lens - The lens is incapable of becoming inflamed since it is composed entirely of epithelium surrounded by a capsule. But its fibers could be poorly developed and degenerative changes could occur.
T34 Are there any scales, crusts, follicles, in any region of the eye?
Scales, Crusts, or Follicles - Example: Scales or crusts on the eyelid, trachomatous follicles, etc.
T35 Are there any type of abnormal growths or tumours in the eye?
Help the Search Process - The reasoning process requires your active co-operation to identify likely possibilities. Do not present signs or symptoms of more than one disease. Please ignore any irrelevant problems which you suspect may also be present.
T36 Has the disease impaired the movements/alignment of the eyeball?
Occular Movements - Impaired movements of the eyeball, or a deviation of the visual axes from their normal alignment?

Results

This study was motivated by the surprising success of a disease diagnostic program developed by the author on a spreadsheet. The program was accidentally able to instantly diagnose a disease when a symptom unique to that disease was indicated. This led the author to investigate the potential of building an Expert System that could mimic the speed and logic of intuition. The author chose to build Expert-AI, an Expert System for diagnosing 225 eye diseases, coding a knowledge builder software for the program. The program consisted of a list of 35 questions that could only lead to unequivocal answers (Yes/Maybe/No), and the algorithm was designed to eliminate diseases rather than select them. The Expert System was evaluated by a panel of doctors at Vijaya Eye Foundation in Chennai, who were impressed with its performance in accurately diagnosing the likely disease as Angular Conjunctivitis. Although the Expert System was successful in diagnosing eye diseases, the doctors noted that all eye doctors were familiar with the linkages, and the program would not be of interest to them. It was suggested that Expert-AI could focus on Syndromes. Constitutional Law, another possibility, suffered the same problem. Lawyers were familiar with Constitutional Law. Only an Expert System that could cover thousands of case laws would be of interest. Design manuals for industry was viable, but the field was limited in 1990. Current Expert Systems (Papageorgiou KG, 2021) focus in narrow knowledge base domains. Expert systems with larger databases have since been overtaken by machine learning systems. In the meanwhile, the Expert-AI elimination algorithm demonstrated the following capabilities:

1. Appears to all intents and purposes to yield the output of a parallel processor.
2. Identifies global context.
3. Completely avoids stupid questions.
4. Does not seek exact matches for identification.
5. Can operate in any field.
6. Is completely logical.
7. In large problem spaces, the Algorithm can yield lighting fast responses.
8. The Algorithm led to a possible explanation for the enigma of intuition.

Intuition - Current View

Intuition is a complex concept that has been studied (Mellin-Johansson C, 2017) in various fields such as psychology, neuroscience, and artificial intelligence. Despite being a central aspect of human decision-making, there is still much to be understood about intuition and how it works. At its core, intuition is often defined as a type of non-conscious, automatic, and rapid thinking process that helps people make quick and seemingly effortless decisions, judgments, or problem-solutions. It is thought to be the result of conscious and unconscious cognitive processes, including pattern recognition, experience-based learning, and unconscious biases, all of which combine to generate a feeling of "knowing" without necessarily knowing how or why. One of the central debates in the scientific study of intuition is whether it is a product of rational or irrational processes. Some researchers argue that intuition is a form of unconscious reasoning that draws on vast stores of acquired knowledge, skills, and experiences to make quick and accurate decisions. Currently, there are several theories and models of intuition that attempt to explain its underlying mechanisms. In psychology, intuition is often defined as a fast, automatic, and effortless form of decision-making that occurs outside of conscious awareness. Studies have shown that intuition is associated with specific brain regions and neural circuits, including the amygdala (Hao Y, 2022), the insula, and the dorsal anterior cingulate cortex, which are involved in processing emotional and sensory information. Others contend that intuition is more subjective and less reliable, driven by unconscious biases and emotions that can lead to errors in judgment and decision-making. These regions are thought to be involved in processing emotions, regulating autonomic responses, and facilitating rapid decision-making, all of which are hallmarks of intuition. The human nervous system is known to process data far slower than a computer. While messages in integrated circuits travel at the speed of light, nerve impulses travel just a few yards per second. While computers process information in millions of cycles per second, the mind runs (Venturino A, 2021) at between 50 and 10,000 cycles per second. When one considers the enormous size of the memory bank of the mind, how does a slower processing system achieve such incredible speed in locating one memory from trillions of memory traces? This process of instant identification is usually called intuition, a hitherto unexplained and mysterious capability of the mind.

The Problem Of Internal Representation

The problem of internal representation (Moser EL, 2008) in communication between the cognitive, emotional, and motor regions of the mind is a complex and multifaceted issue that has been the subject of much debate and discussion in the field of cognitive psychology (Bird CM, 2007). Internal representation refers to the mental processes by which information is processed and stored in the brain, and is thought to play a critical role in shaping our perceptions, emotions, and actions. The challenge of understanding the nature of this internal representation and how it affects our behavior and experiences is one that has captivated researchers for many years. One of the primary challenges of investigating the problem of internal representation is that it is difficult to directly observe the workings of the brain. Our thoughts and feelings are subjective experiences (Simons JS, 2022), and researchers must rely on indirect measures, such as behavior and physiological responses, to infer what is happening in the mind. Despite these difficulties, however, a great deal of progress has been made in recent years in our understanding of the nature of internal representation, and the ways in which it interacts with other brain regions to shape our behavior. The current views that have emerged from research on internal representation is that there are different types of representation that exist within the mind, each with its own unique properties and functions. For example, cognitive representations are thought to play a crucial role in our ability to process and store information, and are closely tied to our ability to plan, reason, and make decisions. Emotional representations (Homann K, 2021) on the other hand, are thought to play a critical role in our experiences of pleasure and pain, and are closely tied to our ability to respond to stimuli in the environment. Finally, motor representations (Ferretti G, 2016) are thought to play a crucial role in our ability to execute movements and interact with our environment. Despite these differences, it is clear that the different types of representation are closely intertwined, and that they work together. For example, our emotional state can influence our cognitive processing, and our cognitive state can influence our emotional state. Similarly, our motor representations can be shaped by our emotional state, and our emotional state can be shaped by our motor representations. This complex interplay between the different types of representation demands a view in the context of the entire mind, rather than focusing solely on one specific aspect of the problem.

Human Memory

The field of memory research has made significant strides in recent years, but it is still grappling with fundamental questions around memory formation and recall. While experiments on simple remembered responses have shed light on how animals form and recall memories, recent findings have focused on the role of specific molecules and proteins in the brain. For instance, the protein cypin has been shown to play a role in the growth of dendrites, and deficits in cypin have been linked to memory impairments Additionally, research has revealed that the molecule PKMzeta forms precise, finger-like connections between brain cells and enhances their responses to danger. Studies have also shown that injecting a drug that interferes with PKMzeta directly into the brain can erase memories of fear and disgust in animals Furthermore, Harvard scientists have identified 117 molecules involved in synaptic junctions that enhance the sensitivity of the synaptic nerve junctions and aid in linking neural pathways. Despite these advancements, there are still unexplained enigmas in our understanding of memory. The rapid growth of branches to store the human capacity of remembering 10,000 images displayed at one second intervals has been deemed unrealistic, and damage to the hippocampus cannot explain how one among a trillion smells could be instantly recalled. Current research does not cover what some researchers believe to be an infinite human memory. This paper suggests that the entire nervous system operates on combinatorial pattern recognition. Combinatorial memories in nerve cell axon hillocks are capable of storing an infinite memory. This theory offers a more nuanced and sophisticated understanding of how the nervous system processes and responds to external stimuli.

Combinatorial Coding

This paper proposes a search algorithm for the mind to achieve intuition-like speed by eliminating irrelevant data. The nervous system has used this approach for hundreds of millions of years in the olfactory system, allowing for instant recognition of odors and distinguishing between threatening, consumable, or irrelevant objects. The nerve cells map (Kebschull JM, 2019) from region to region in parallel combinatorial arrays, carrying the internal language of the mind through codes and inhibition. This parallel mapping enables myriad independent intelligences to communicate through a unique neural code that is central to this language. Combinatorial arrays map this language, enabling interaction between senses, emotions, and motor controls. The precise neighborhood relationships of these arrays enable swift inhibition, and the firing of one cell is known "shut down" millions. Sensitivity to the message of a single cell in an array indicates combinatorial messaging. The process cascades data through arrays carrying combinatorial messages, enabling the mitral cell array (Wang IH, 2022) to recognize specific molecules in the air and finally trigger motor control messages. The nervous system's combinatorial coded messages, controlled by an elimination algorithm, enable instant recognition.

Intuition May Be An Elimination Algorithm

INTUITION HAS LIGHTNING FAST RESPONSES

With all relationships in memory, Expert-AI is able to recognize a specific condition instantly. If only one disease has a positive relationship with a unique symptom, a "Yes" response to this symptom eliminates all other diseases, leading to immediate recognition. With his intuition, a doctor may walk into a surgery and instantly identify a heart attack in a patient with just minimal visual cues, recognizing a single pattern among many others in a fraction of a second. This suggests that intuition may be using an elimination algorithm.

INTUITION AVOIDS STUPID QUESTIONS

Expert-AI eliminates the occurrence of "stupid questions" by implementing a more efficient and holistic approach to search. Unlike traditional search algorithms that look for a single disease to match a symptom, Expert-AI evaluates the entire database in relation to the current answer. This enables Expert-AI to effectively eliminate any possibilities that have been ruled out by previous answers. Intuition also avoids stupid questions. If a person who believed that all birds fly, encountered an ostrich, he would never again ask whether there are any birds that do not fly.

INTUITION CONTROLS THE MIND THROUGH INHIBITION

The power of intuition lies in its ability to control the mind through inhibition. While Expert-AI may follow a logical deductive reasoning approach, intuition also engages in a logical deduction process that cuts off the database when emotions strike. Emotions act as a filter, inhibiting memories that do not align with their specific objectives. For example, when anger (Gilam G, 2017) strikes, a person cannot remember reasons why they should not be angry, as those memories are inhibited. Similarly, intuition inhibits irrelevant data, allowing one to focus on the most important and pertinent information. Even in the animal kingdom, intuition controls behavior through inhibition. When an animal is thirsty and chooses to drink, hunger pangs are inhibited, enabling the animal to focus solely on satisfying its thirst. Therefore, intuition's strength lies in its ability to selectively inhibit irrelevant information and prioritize the most critical data for decision-making.

INTUITION SOLVES THE PROBLEM OF INTERNAL REPRESENTATION

According to this paper, the nervous system employs a combinatorial recognition model instead of the conventional linear summation (Reid E, 2015) model. Unlike the linear summation model, which is confined to simple input summation, combinatorial recognition (Royal KT, 2016) enables the autonomous storage of complex patterns and interconnections between inputs. This approach allows all regions of the nervous system to communicate with one another, addressing the challenge of internal representation for the mind. In addition, intuition plays a critical role in holistically controlling the system. It operates as an elimination algorithm, effectively removing irrelevant information from the entire database. This suggests that intuition functions as an integral component of the combinatorial recognition model, enabling the nervous system to efficiently process and store complex information.

INTUITION SOLVES THE PROBLEM OF LACKING EXACT MATCHES

Similar to Expert-AI, intuition avoids the limitations of exact pattern recognition by utilizing an elimination algorithm. Many AI algorithms depend on matching the attributes of a known pattern with those of a new pattern, stored in computer memory for later retrieval. However, in cases such as face recognition (Martins P, 2022) this method of identification becomes increasingly difficult due to the billions of faces in the world, each with thousands of overlapping features that exist on an almost infinite scale. Expert-AI addresses this challenge by using an elimination algorithm that can establish the identity of a pattern based on its distinctive characteristics. Likewise, intuition employs an elimination algorithm to overcome the challenge of exact pattern recognition, enabling it to filter out irrelevant information and focus on the most important and unique attributes of a given pattern. In doing so, intuition can effectively recognize and identify complex patterns, much like Expert-AI's algorithms.

INTUITION HANDLES UNCERTAINTY

Intuition tackles uncertainty (Meyer VR, 2007) through an elimination algorithm, much like Expert-AI. One of the significant challenges in traditional AI is managing uncertainty. Binary logic, which operates on the premise of a characteristic being either present or absent, often struggles to cope with the ambiguous and uncertain relationships between characteristics and patterns. Fuzzy logic (Raza K, 2019) addresses this uncertainty by assigning degrees or grades to characteristics, such as short, medium height, tall, and very tall. However, fuzzy logic fails to handle scenarios where a person occasionally wears glasses. Expert-AI's approach to uncertainty involves eliminating obvious objects and retaining uncertain ones, then using a series of questions to progressively eliminate the remaining possibilities. Similarly, intuition manages uncertainty by applying an elimination algorithm that removes irrelevant information and prioritizes the most significant and relevant attributes of a given pattern. This allows intuition to effectively navigate uncertain situations and make sound decisions in the face of ambiguity, much like Expert-AI's algorithms.

INTUITION IDENTIFIES CONTEXT

Intuition, much like Expert-AI, leverages an elimination algorithm to manage the challenge of context (Kragel JE, 2021) in AI. Identifying context is a significant obstacle for AI researchers, particularly in tasks such as machine translation. Unlike machines, which must systematically compare the characteristics of objects with those stored in memory, the mind instantly recognizes the context of objects or events, drawing on a lifetime of memories and associations. To help address this issue, AI researchers have developed heuristics (Blumenthal-Barby, 2015) a method for determining the direction of the search in small search spaces. However, heuristics can only provide limited guidance and can quickly be overwhelmed in large and complex search spaces, leading to the problem of combinatorial explosion. Expert-AI handles the challenge of identifying context by using an elimination algorithm that removes irrelevant information and retains uncertain objects, allowing it to deal with the entire database and preserve context in the search space. Similarly, intuition applies an elimination algorithm that prioritizes the most significant and relevant attributes of a given context while disregarding irrelevant details. This approach enables intuition to effectively manage the challenge of context, much like Expert-AI's algorithms, making it a powerful tool for navigating complex and uncertain situations.

Conclusion

In conclusion, this paper presents the hypothesis that intuition may be based on an elimination algorithm using combinatorial recognition in nerve cell decision making. The paper supports this hypothesis by discussing recent advances in our understanding of the nervous system and the success of an expert system for diagnosing eye diseases using an elimination algorithm. The author also provides evidence from research results of the olfactory system, which uses combinatorial pattern recognition, to support the argument that intuition is a pattern recognition algorithm. The paper concludes that intuition is a critical component of human cognition and that further research is needed to fully understand its mechanisms and its role in shaping our thoughts, emotions, and decisions. Overall, the paper offers a fresh perspective on the elusive and fascinating topic of human intuition, and the role of combinatorial recognition in nerve cell decision making.

History Of Emotions

Emotions have fascinated human beings since time immemorial. Philosophers, psychologists, and neuroscientists have been studying them for centuries, trying to understand their nature, function, and role in our lives. Today, the scientific view of emotions is complex, nuanced, and multifaceted, reflecting the many advances in our knowledge and techniques. At a basic level, emotions can be defined as subjective experiences that are associated with physiological and behavioral changes. Emotions can be positive or negative, intense or mild, and fleeting or enduring. They are often triggered by internal or external stimuli, such as thoughts, memories, sensations, or events, and they can influence our thoughts, feelings, and actions in various ways. The history of our knowledge of emotions can be traced back to the early days of science when they were viewed as irrelevant to the rational modern mind, a vestige of primitive times. However, Charles Darwin's work (Stamenković B, 2022) challenged this view by suggesting that emotions have a real-world existence, visibly expressed in the behavior of humans and lower animals. He proposed that emotions could be derived from an angry face or even a bad feeling in the stomach. Initially, emotions were considered as essentially bodily and visceral responses. This view was challenged by W.B. Cannon, (Weisfeld GE, 2013) who demonstrated that emotions did not follow artificial stimulation of visceral responses. He showed that emotional behavior was still present when the viscera was surgically or accidentally isolated from the central nervous system. This led to the realization that emotions existed, but they were not merely the churning in the gut or the knot in the stomach. In contemporary science, the understanding of emotions remains a subject of ongoing inquiry and debate due to the intricate and multifarious nature of the phenomenon. The scientific exploration of emotions has progressed significantly, with advances in techniques and knowledge. However, despite the progress made, the scientific study of emotions lacks a clear focus due to an incomplete understanding of the underlying mechanisms involved in the processing of emotional information. One such mechanism that remains elusive is the role of pattern recognition by the mind in the experience and expression of emotions. The limited understanding of this fundamental aspect of emotional processing poses a challenge to the scientific community in their efforts to unravel the complexities of the emotional experience.

Emotions And Pattern Recognition

Intuition can be described as a combinatorial pattern recognition algorithm, that utilizes combinatorial codes as the common language of the mind for internal representation. This implies that all regions of the nervous system share the same common language and combinatorial codes represent thoughts, motor controls and emotions. Intuition applies controls through inhibition. Emotional code patterns operate by inhibiting various functional regions of the brain, making them powerful manipulators of behavior (Niedenthal PM, 2007) that can significantly influence an individual's actions and thoughts. Examples of such emotional patterns include anger, fear, and despair, which can override positive thoughts and lead to impulsive actions that disregard consequences. Emotional code patterns are so influential that they can even suppress basic abilities. For instance, fear can immobilize a person, making even slight movements seem life-threatening, such as when the combinatorial codes for fear of heights (Vlaeyen JWS, 2000) dominate the entire system, and the simple ability to walk on a plank becomes frozen. The power of emotional code patterns is evident in the the essential inhibitive roles of intuition, which achieves a single final output every time. This same process enables emotions to totally control an individual's expressions, muscle movements, facial expressions (Franěk M, 2022), choice and tone of words, and access to memories.

Emotions As Subsets Of A Hierarchy Of Controls

The human limbic system (Catani M, 2013) is known to play a key role in intuitive decision making, wherein the control of behavior is rapidly and dynamically shifted between competing emotional states. Specifically, the limbic system is responsible for the activation and inhibition of distinct emotional states, which serve to micromanage a range of motor, facial, and linguistic behaviors. Here, we posit that the intuition-driven emotional system is best viewed as an elimination algorithm, whereby the activation of a given emotional state serves to inhibit competing emotions with conflicting objectives. For instance, love may inhibit the onset of anger, allowing for a cohesive expression of emotion and behavior. This nuanced and subtle regulation of the human behavioral repertoire is thought to be underpinned by the sophisticated pattern recognition abilities of the limbic system, which exercises fine-grained controls over the intensity, nuance, and timing of motor and communicative outputs. Furthermore, the ruling emotion is believed to exert control over the access and processing of memories throughout the system.

Emotions Manipulate Behavior

Emotional code patterns trigger a drive and a remembered strategy to cope with life's challenges. Anger generates an aggressive drive, fear triggers a defensive strategy, love generates a caring and protective response, while jealousy instigates attacks on competitors. Each emotional code pattern communicates across the system to take actions in line with its strategy, competing with other emotional codes for control of the mind. The elimination algorithm of intuition selects the winning code and inhibits conflicting objectives, with intuition serving as an elimination algorithm that switches these controls through inhibition. Vast combinatorial memories have crafted a remarkably high standard of behavior within the codes that trigger love, a single emotion that inspires the best in humanity.

Emotions Operate Through Inhibition

Emotions are influential manipulators of behavior that can significantly alter an individual's actions and thoughts. Recent research suggests that intuition is an elimination algorithm that operates by inhibiting different regions of the brain. Anger (Zhan X, 2018) and fear are prime examples of such emotions that can override positive thoughts and lead to impulsive actions that disregard consequences. The influence of emotions is such that they can even suppress basic abilities, such as the ability to walk on a plank when experiencing fear. Emotions generate a drive and a remembered strategy to cope with life's challenges, with anger generating an aggressive drive, fear triggering a defensive strategy (Tovote P, 2015), love generating a caring and protective response, and jealousy instigating attacks on competitors. Each emotion competes with one another for control of an individual's mind, with the winning emotion inhibiting conflicting objectives. The power of emotions is reflected in an individual's expressions, muscle movements, facial expressions, choice and tone of words, and access to memories. With love (Esch T, 2005), nature's pattern recognition processes have crafted a remarkably high standard of behavior within the codes of a single emotion, inspiring the best in mankind. Therefore, understanding the role of emotions and intuition in decision-making can provide new insights into how humans navigate complex social interactions and make choices in uncertain environments.

Combinatorial Memories

Combinatorial memories trigger complex strategies. The emotional codes play a crucial role in supporting emotions, which trigger a multitude of finely controlled behavioral patterns by accessing the exact knowledge necessary for survival. An animal's lifetime of encounters and experiences are inherited as combinatorial memories, and these memories (Ristau CA. 2013) are extracted when the system feels uneasy, fearful, or angry. The system restricts an individual's vision and controls their response by controlling the access to a focused set of memories. For example, anger extracts memories of muscular responses to battle, convincing an individual that they have every right to be angry and blinding them to any other viewpoint. The power of emotions is a result of their ability to tap into these inherited combinatorial memories, which provide a specific strategy for every situation. An animal cannot afford to remain frozen between decisions, either to drink water, or to eat grass. If a decision to drink is taken, its hunger demands are instantly inhibited. So also, fear inhibits its option to stay back and fight. The animal's intuition recalls memories of escape routes, while suppressing memories of previous successes. Its mind provides memories in context to enable it to cope with its immediate tasks.

Conclusion

In conclusion, this paper offers a novel hypothesis that emotions are pattern recognition responses of the nervous system, and intuition may be based on combinatorial recognition algorithms in nerve cell decision making. The evidence presented from recent advances in understanding the nervous system and successful expert systems for diagnosing eye diseases supports this hypothesis. The research results of the olfactory system using combinatorial pattern recognition further reinforce the argument that intuition is a pattern recognition algorithm. The paper also suggests that emotions play a critical role in human behavior and that many of humanity's problems are a result of the quirks of the intuition process. As emotions override rational behavior and inhibit access to knowledge, they often lead to unintelligent behavior. This paper offers a fresh perspective on the fascinating topic of human emotions and highlights the essential role of combinatorial recognition in nerve cell decision making.

Implications

ˆThe findings of this paper have significant implications for our understanding of human emotions as a pattern recognition process. The use of combinatorial recognition in nerve cell decision-making provides a more sophisticated understanding of how the nervous system processes and responds to external stimuli. By viewing the brain as a holistic pattern recognition entity, this research opens up new possibilities for understanding emotions. Understanding the role of inhibition in irrational human behavior and recognizing human emotions as pattern recognition phenomena can lead to improved diagnosis and treatment of various mental conditions and more effective treatments for neurological disorders. In addition, a greater understanding of the role of emotions in human cognition has implications for fields such as psychology, education, and decision-making, providing insight into how humans process and respond to information. In summary, this paper highlights the importance of continued research into the mechanisms underlying human emotions and the potential benefits that could be derived from a better understanding of these processes.

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