Recognizing Reader's Affect Using EEG Data

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Outline of the Presentation

1. Overview of the Current State of Technology
   a. Emotions (Affect)
   b. Affective Computing
   c. Emotion Detection and Recognition
   d. Reading Fiction
2. Research Problem
3. Objectives / Scope and Limitations
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Overview of the Current State of Technology

Emotion Theory

Emotions or affect play **vital roles** in **rational and intelligent behavior** such as cognition and decision making.

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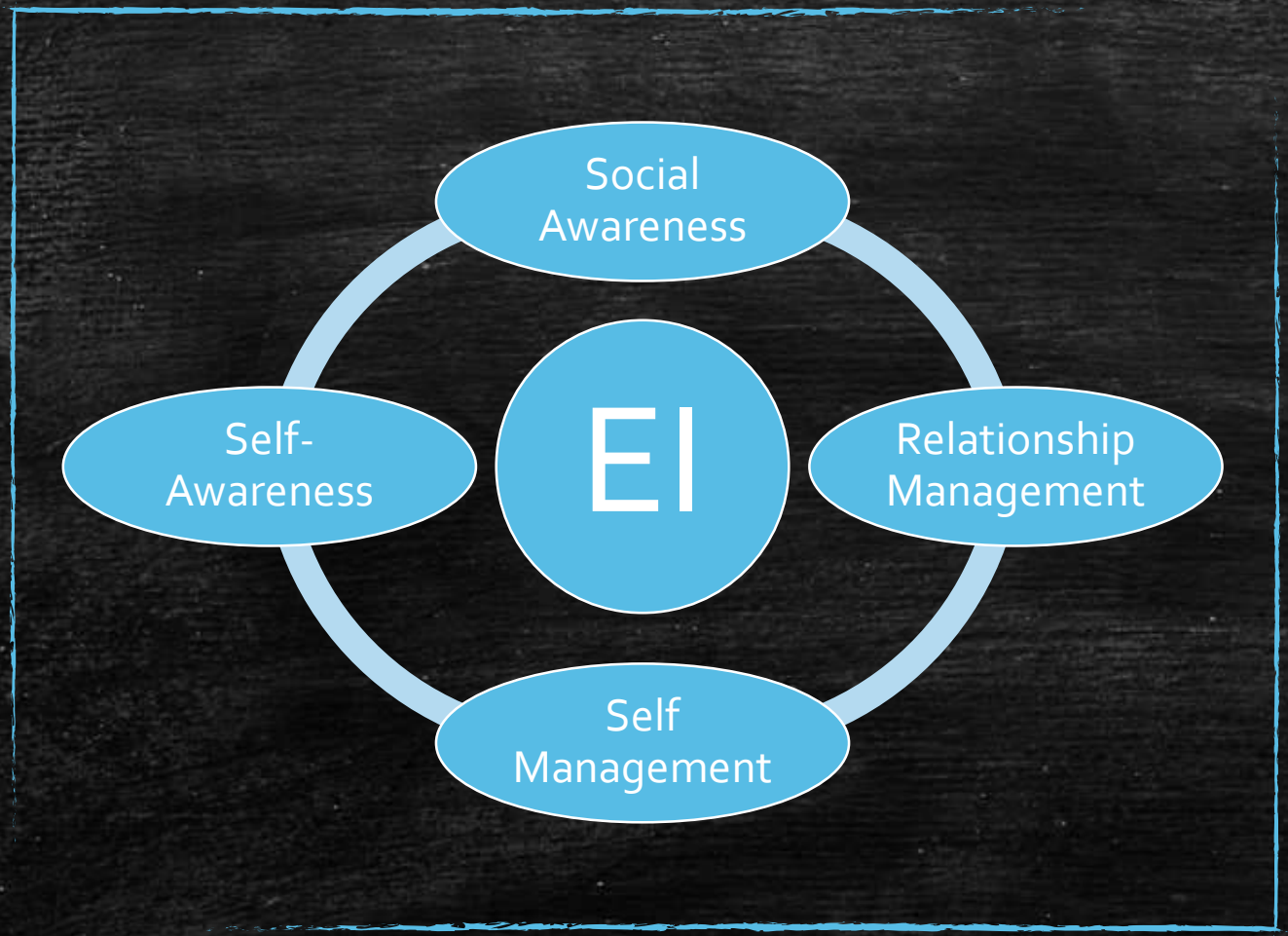
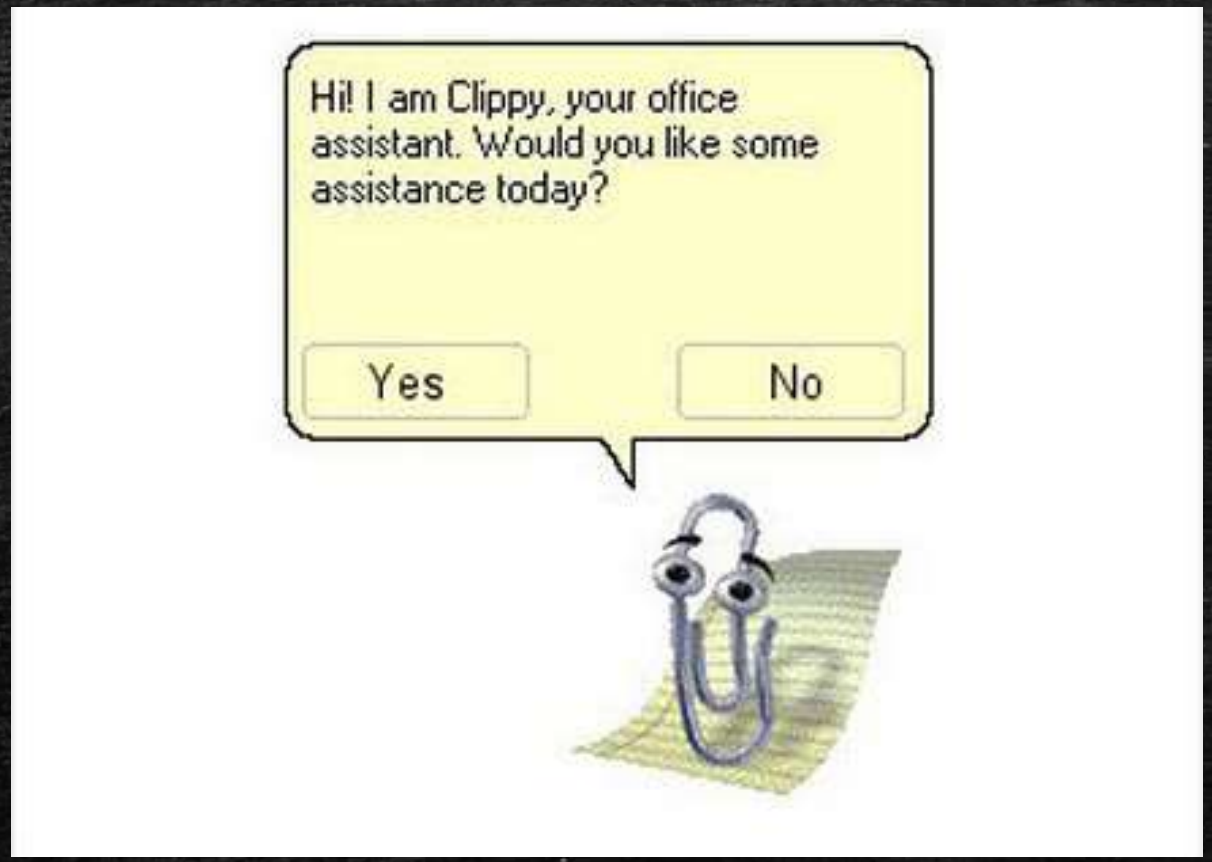
Emotional Intelligence



Emotional Intelligence is a subset of social intelligence that involves the ability to **monitor** one's own and others' feelings and emotions, to discriminate among them and to **use this information** to guide one's thinking and actions.

Affective Computing



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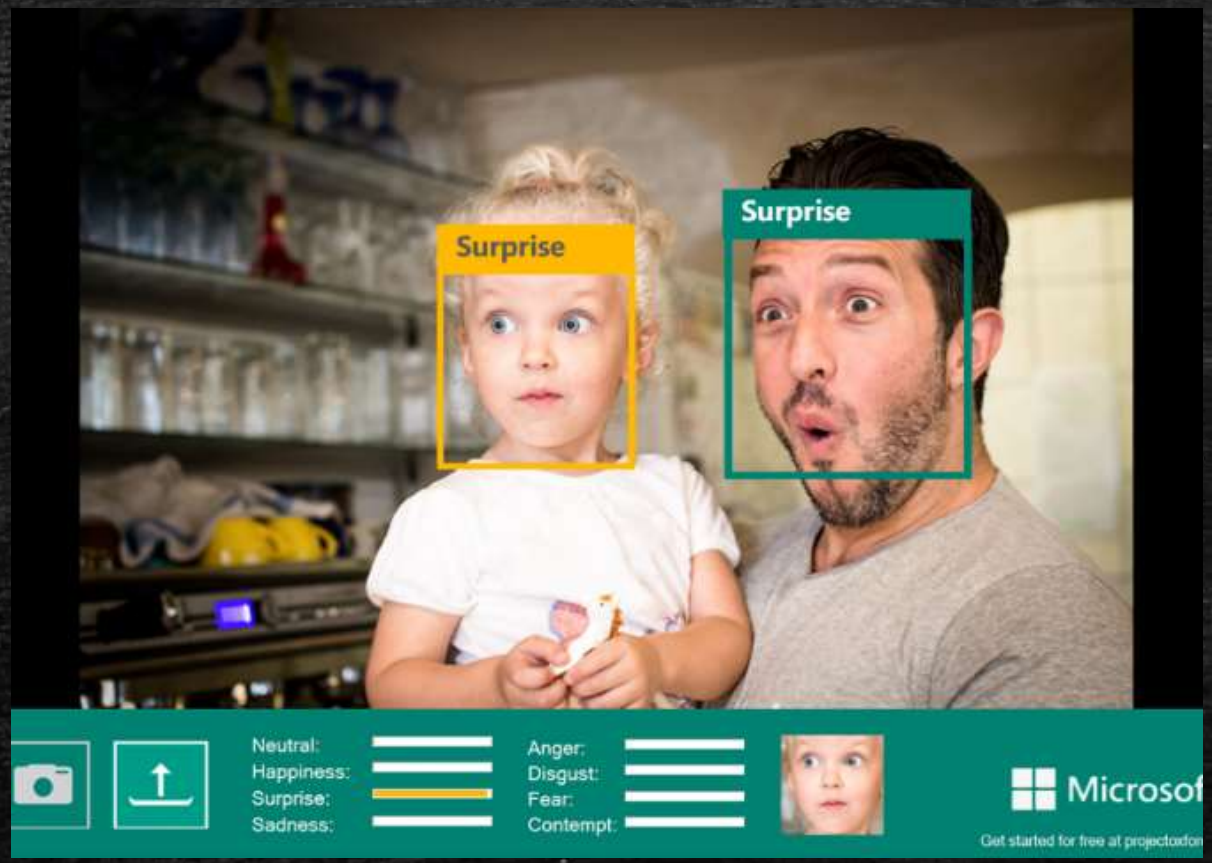
Affective computing is computing that relates to, arises from, or influences emotions.

- Perceive emotions
- Express emotions
- Perceive and express emotions

Emotion Detection and Recognition



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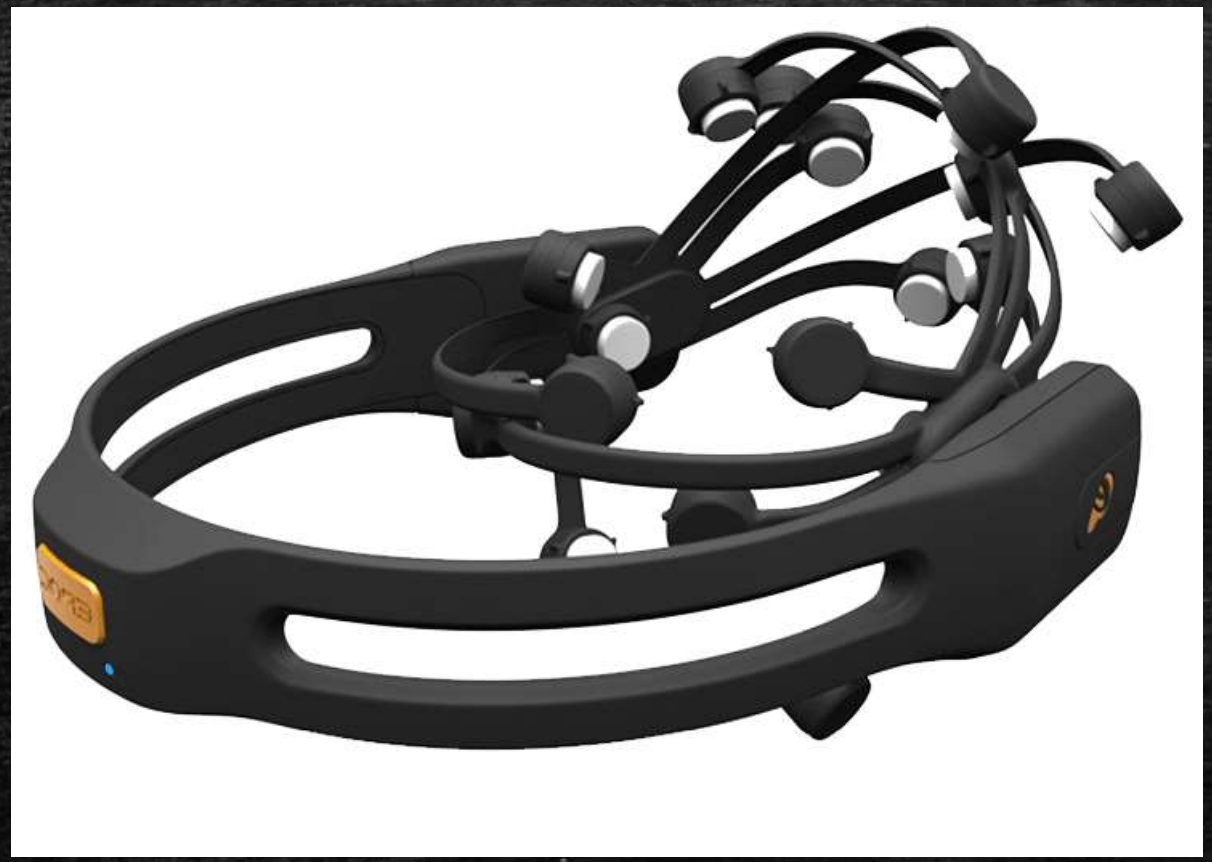
Humans naturally read many **physiological signals** of emotions

- Facial expressions
- Vocal expressions
- Skin conductance
- Heart rate

Electroencephalography



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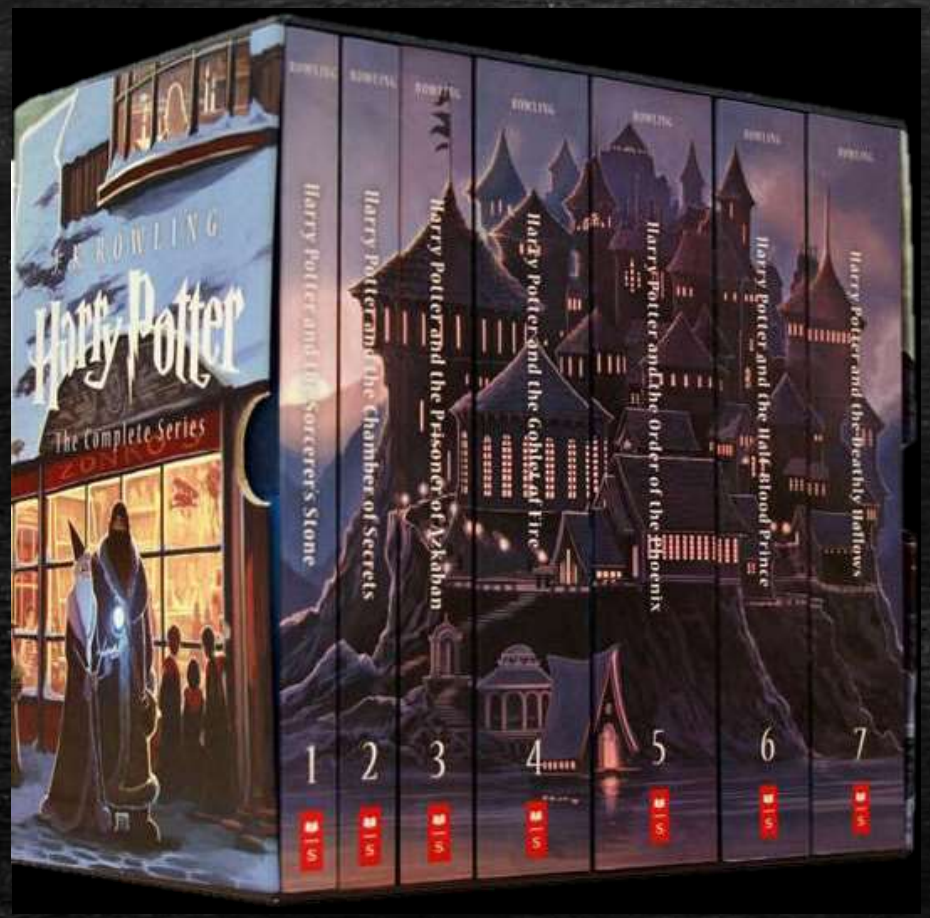
EEG is the recording of the **brain's electrical activity** and represents a way to look at the brain functions in real time.

Reading Fiction



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Reading is an **experience** that is never the same from one reading to the next. To read **non-fiction** is to be **informed**; to read **fiction** is to be **moved**.

There is no current work that has studied **brainwave patterns** and their association to **affect** while a person is **reading literary fiction**.

Research Problem

Objectives / Scope and Limitations

To build an **affect model** that associates the EEG signals collected from readers (while they are reading stories) to specific emotions.

General Objective

Specific Objective #1

Objective

- To **review** the approaches, methodologies, and experiments of existing affect detection or recognition studies that uses EEG data;

Scope and Limitation

- A review of **existing affect detection or recognition studies** that uses EEG data.

Specific Objective #2

Objective

- To **identify** the different emotions the can be elicited from the readers by the stories;

Scope and Limitation

- A review of **different emotion models** and determine which of them is appropriate for reader affect.

Specific Objective #3

Objective

- To **build** a corpus of EEG signals;

Scope and Limitation

- The participants will be people of ages between 18 to 25
- **They will read pre-selected short stories while an EEG sensor is attached to them**
- The set-up of Miall and Kuiken (1994) will be used as basis

Specific Objective #4

Objective

- To **determine** which elements of a story affects the reader's emotional state;

Scope and Limitation

- The study will attempt to determine which element of the story **triggered** the reader to evoke that emotion.
  - character traits and behavior
  - reader's empathy to the character
  - the story plot or casual chain of story events
  - lexical choices and sentence structure.

Specific Objective #5

Objective

To **implement** supervised and unsupervised machine learning algorithms for classifying the emotion based on the EEG signals;

Scope and Limitation

- A review of related literature **to identify** unsupervised or supervised classification techniques **best suited** for the data

Specific Objective #6

Objective

To **define** evaluation metrics for assessing the performance of the model;

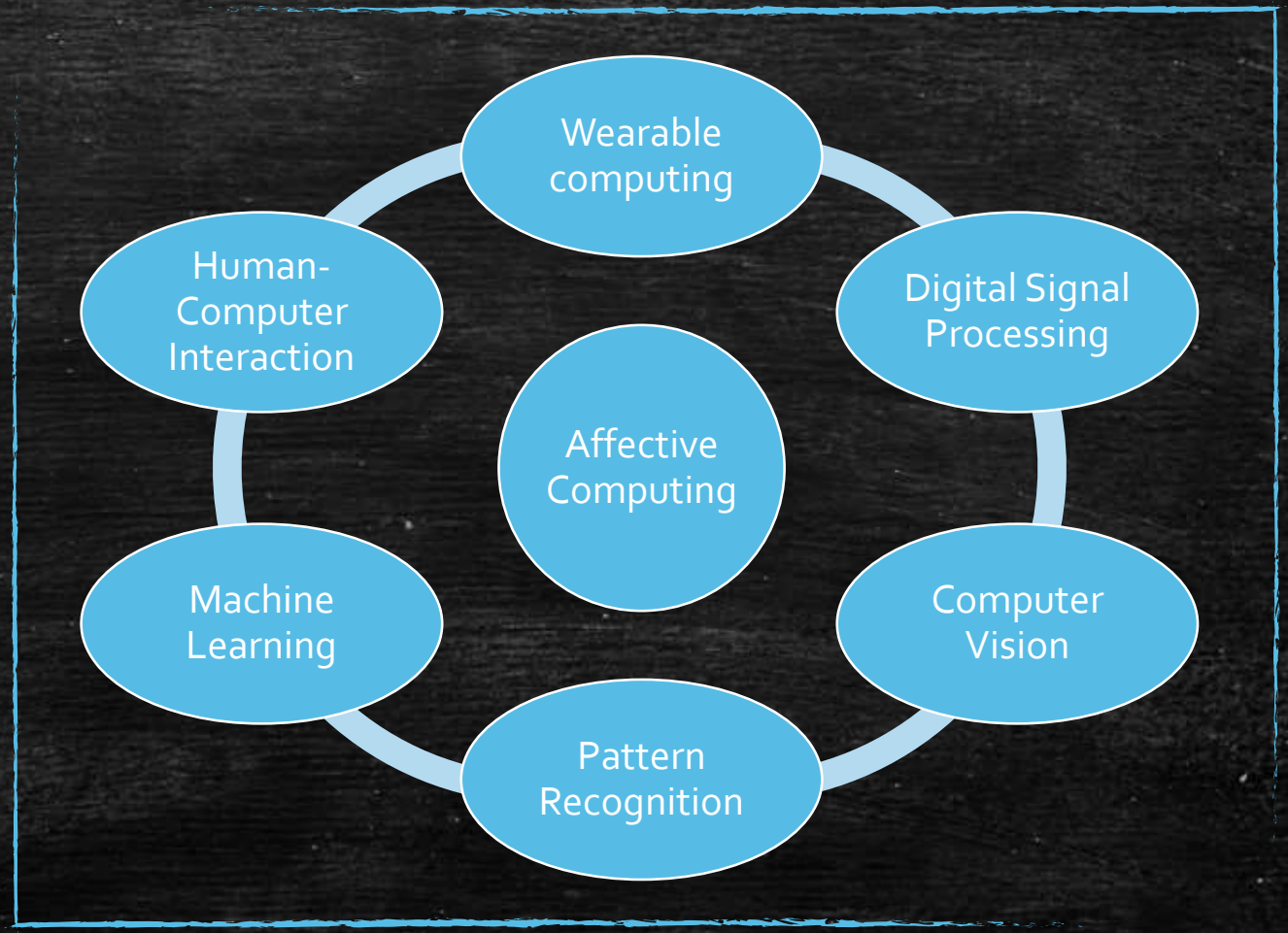
Scope and Limitation

- Precision
- Recall
- F-measure

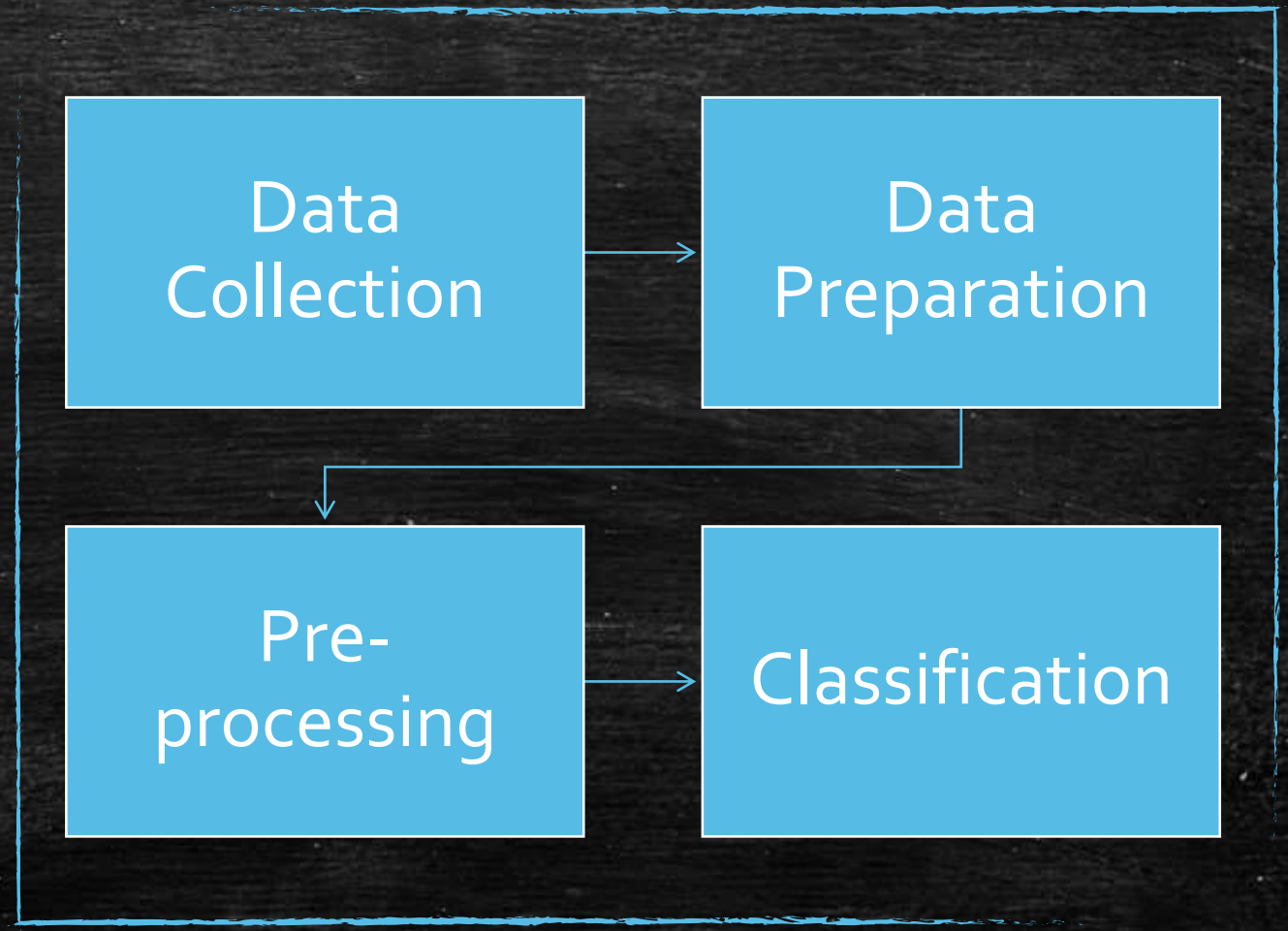
Research Significance

Affective Computing

Explore the **feasibility** and **application** of these existing areas on an **unexplored domain**.



Methodology and Experiments



Serve as **basis and reference** for related future studies.

Affect-Related Systems

Results of this study can be further utilized in **intelligent tutoring systems** (ITS) or **embodied conversational agents** (ECA).

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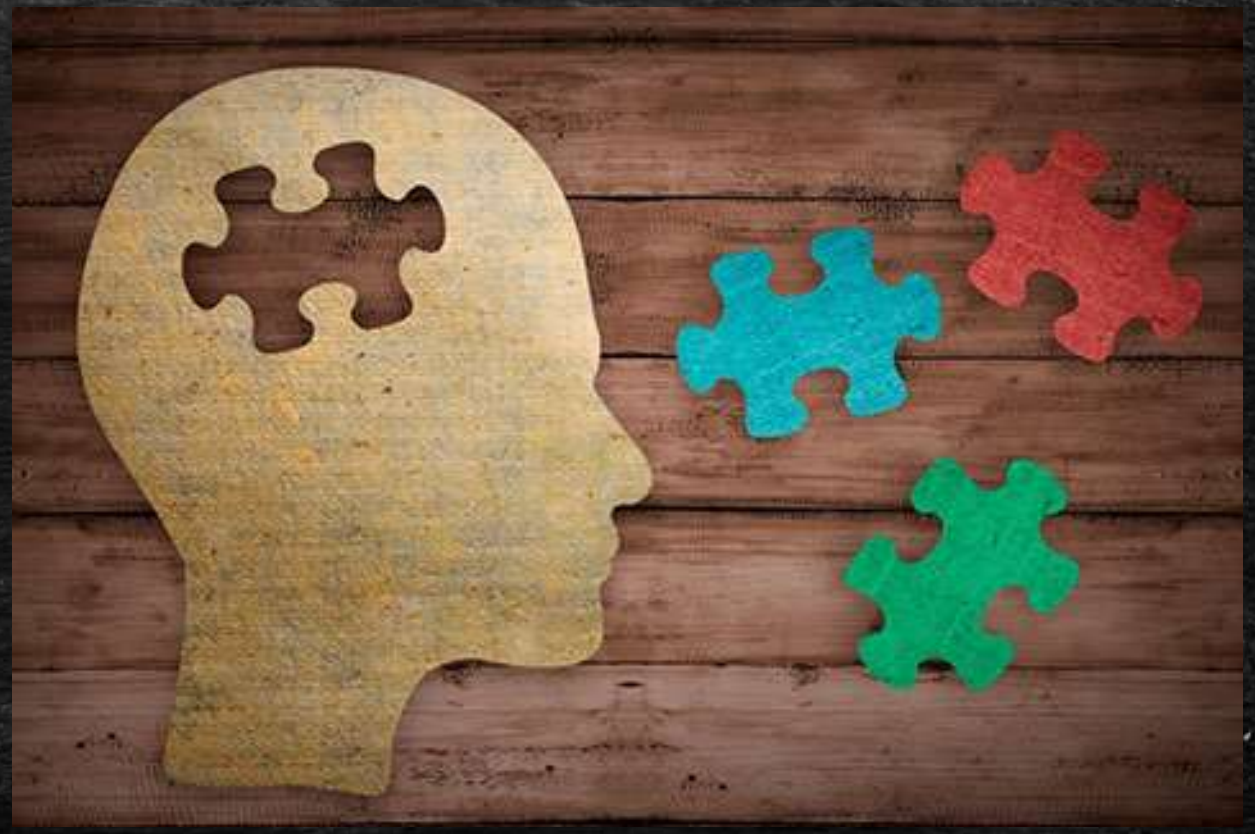
Beyond Computer Science…

The findings of this work may be informative to **affective science**, **psychology**, and other related fields.



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Thank you for listening! ☺

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