

iKarate: Improving Karate Kata

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In Collaboration With:



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Dr. Ayman Nabil

Teaching Assistant: Eng. Nada Ayman

5/3/2020

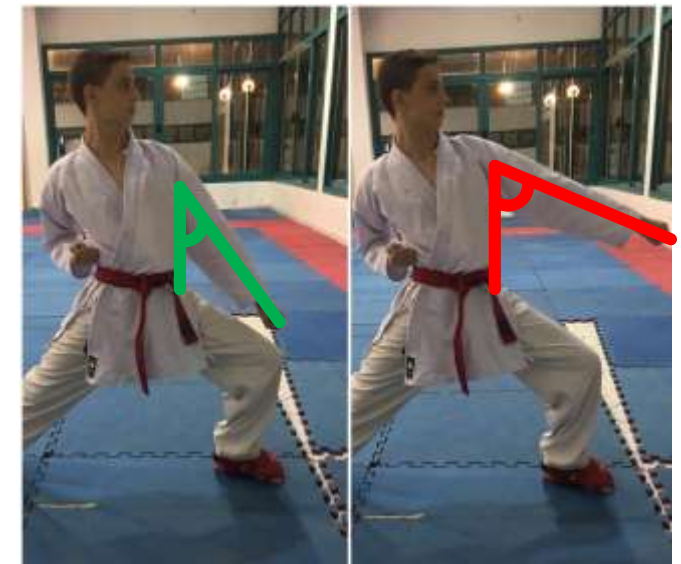
INTRODUCTION 1/2

- ❑ Karate Kata is composed of moves.
- ❑ Moves must be done in a certain way.
- ❑ **Common mistakes:**
 - Joints Angle.
 - West Rotation.
 - Hand Position.
 - Leg Position.

Age Uke

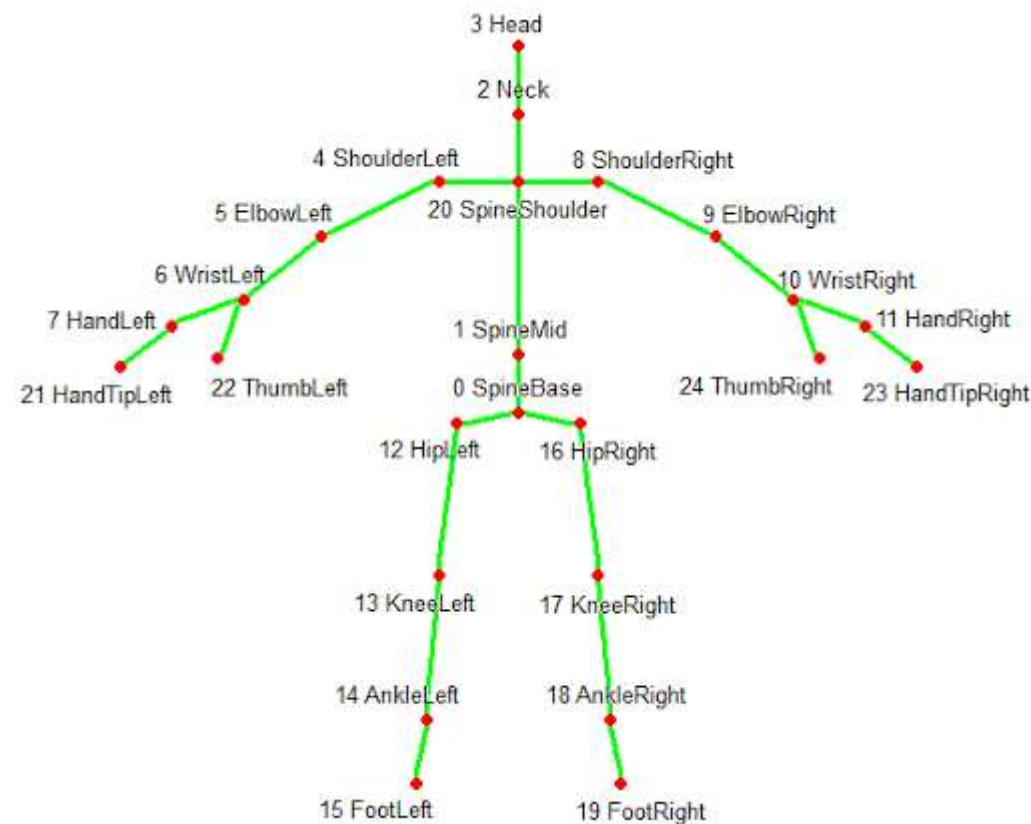


Gedan Barai



INTRODUCTION 2/2

- ❑ Kinect support the tracking of up to 6 people.
- ❑ Kinect supports the tracking of up to 25 joints.
- ❑ Each joint is identified by its name.
- ❑ Each joint has its coordinates (X, Y, Z).
- ❑ The skeleton has 2 tracking states (Tracked - Not Tracked).

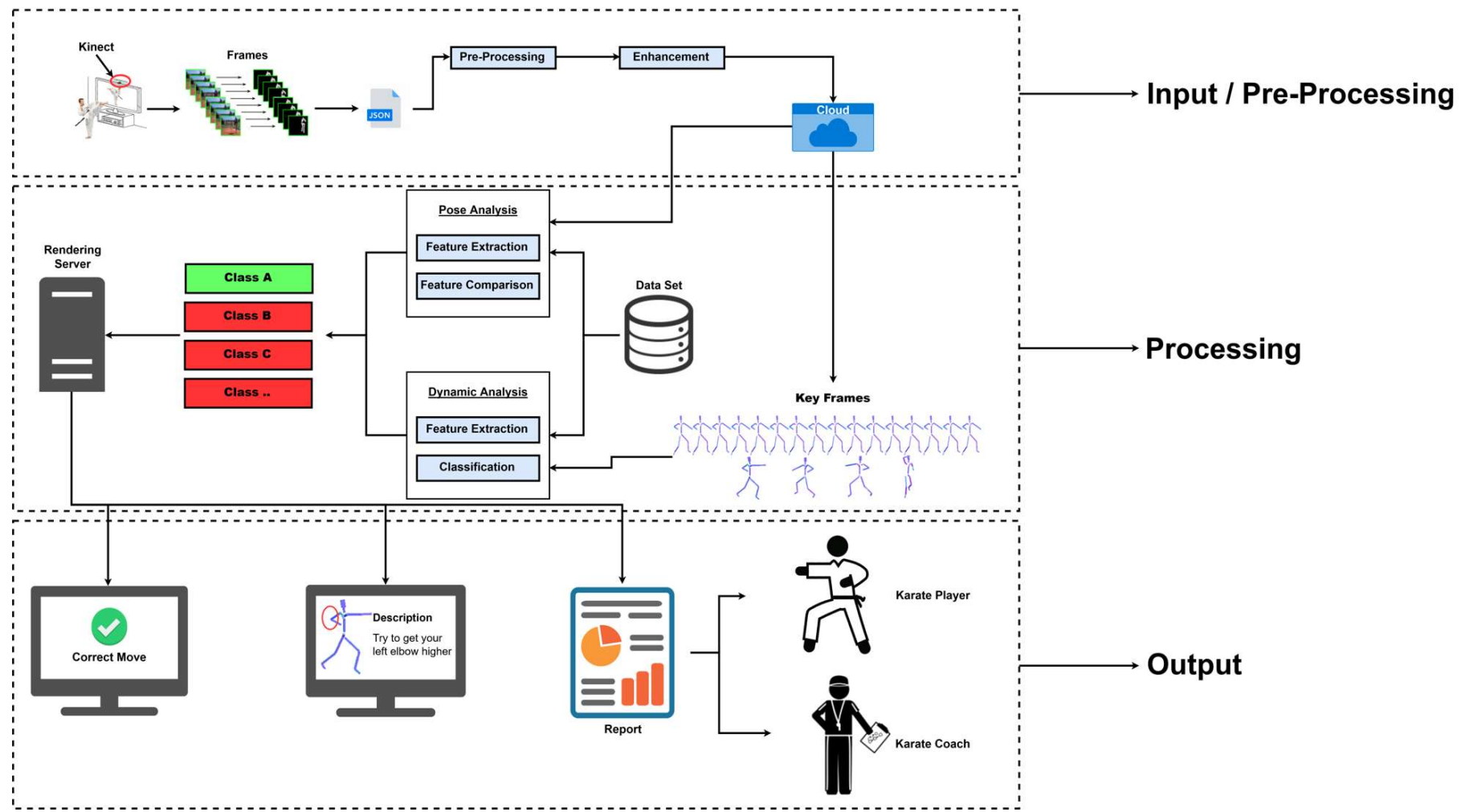


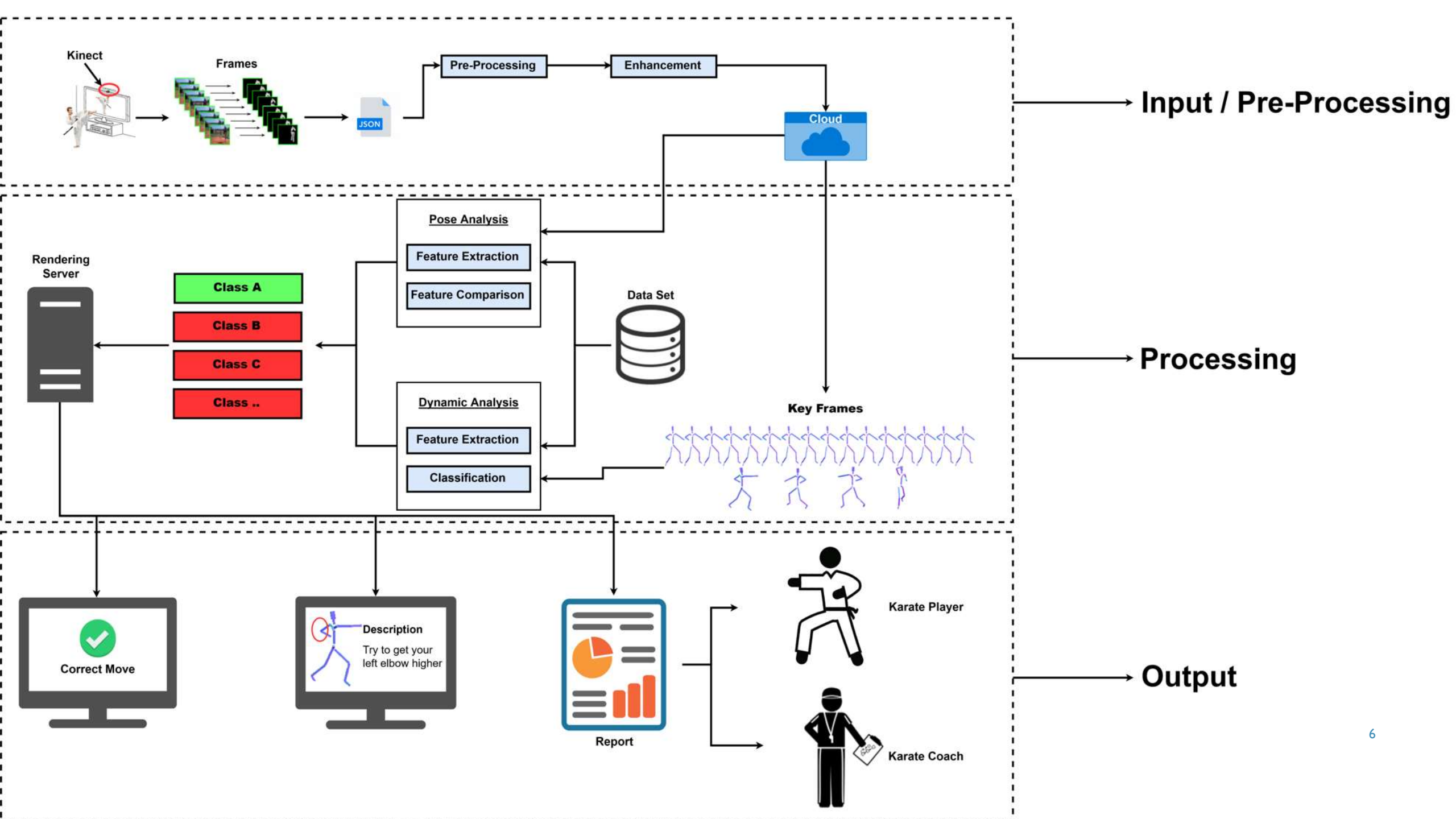
PROBLEM STATEMENTS



Enhancing the **Classification Accuracy** of karate kata, providing **Real-Time Feedback** and taking into consideration the Different Speed And Body Proportions.

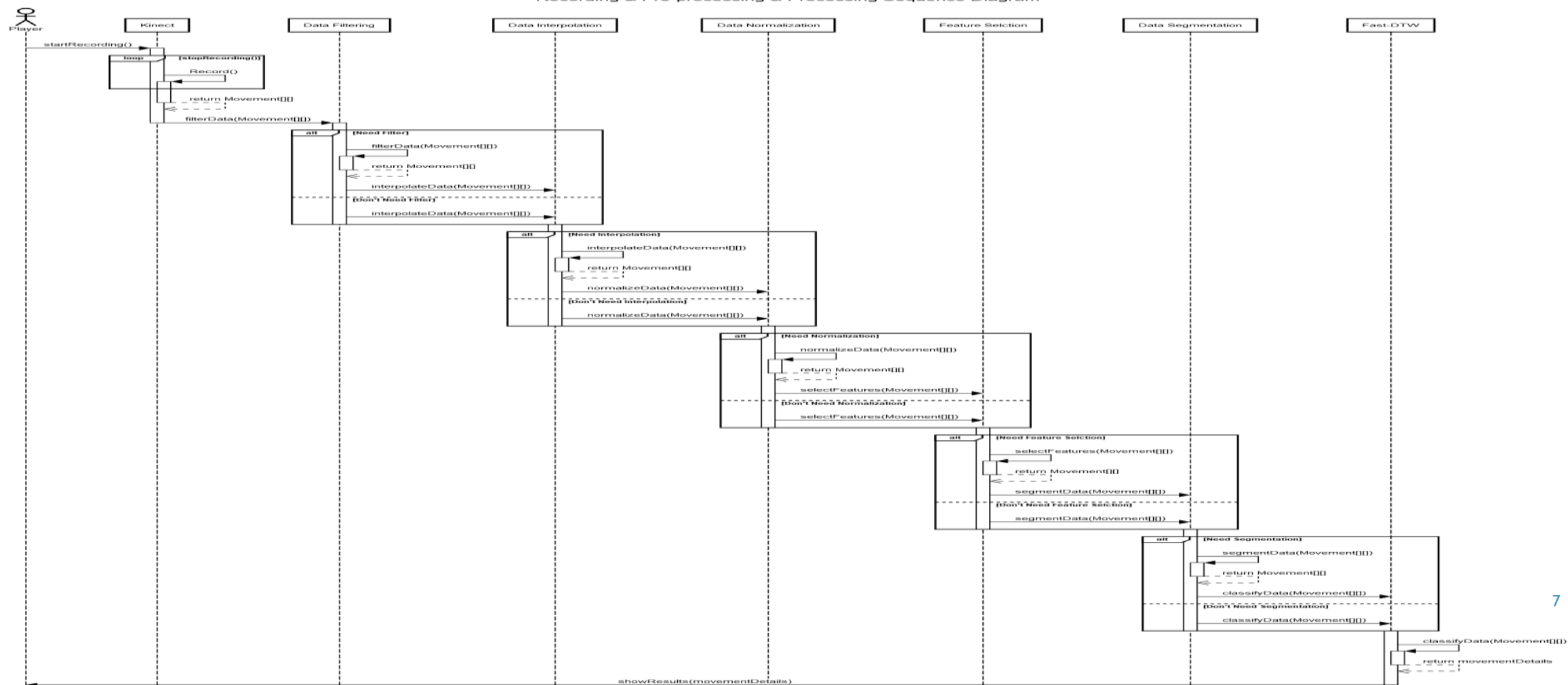
SYSTEM OVERVIEW DIAGRAM



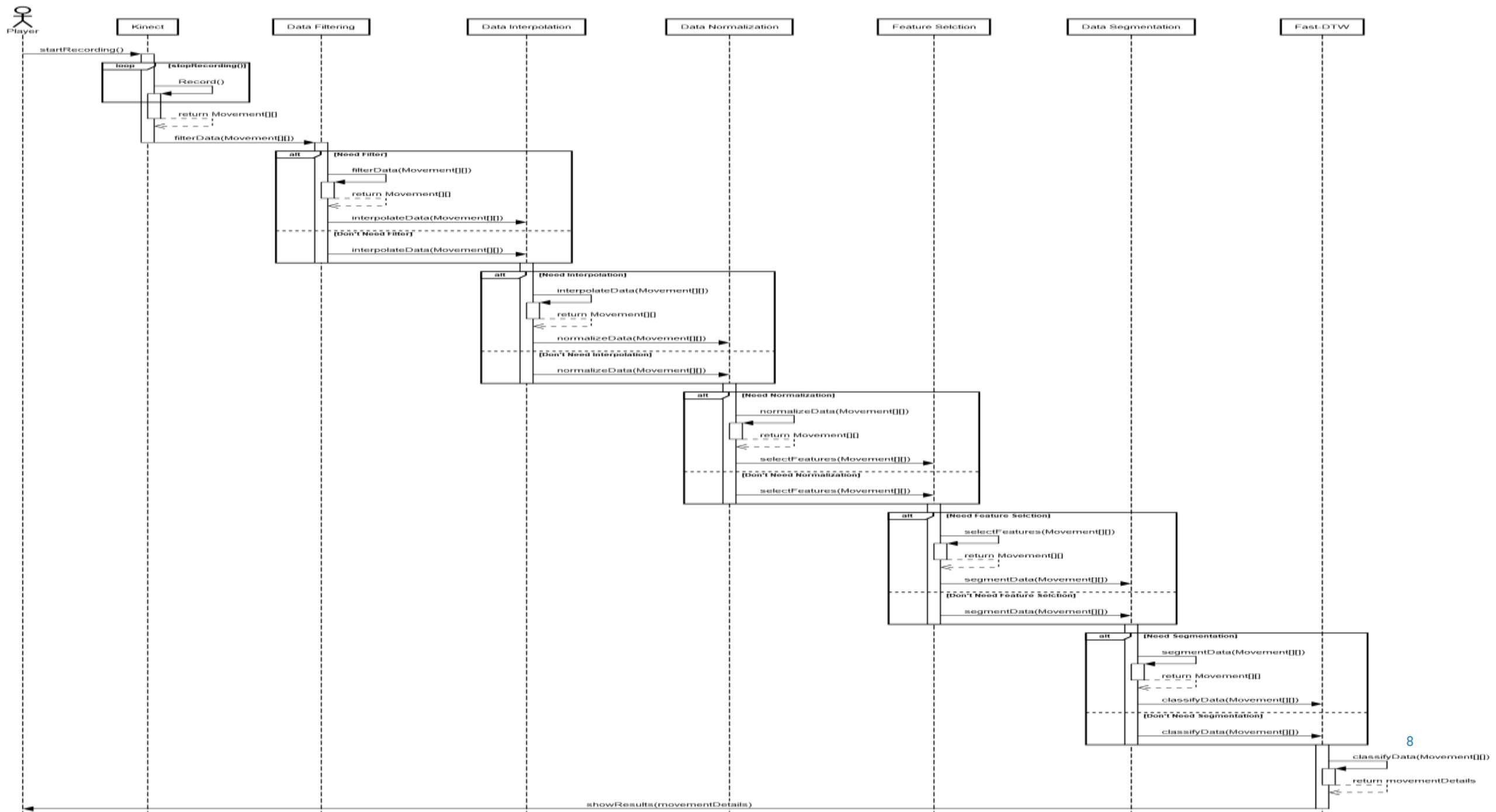


SEQUENCE DIAGRAM

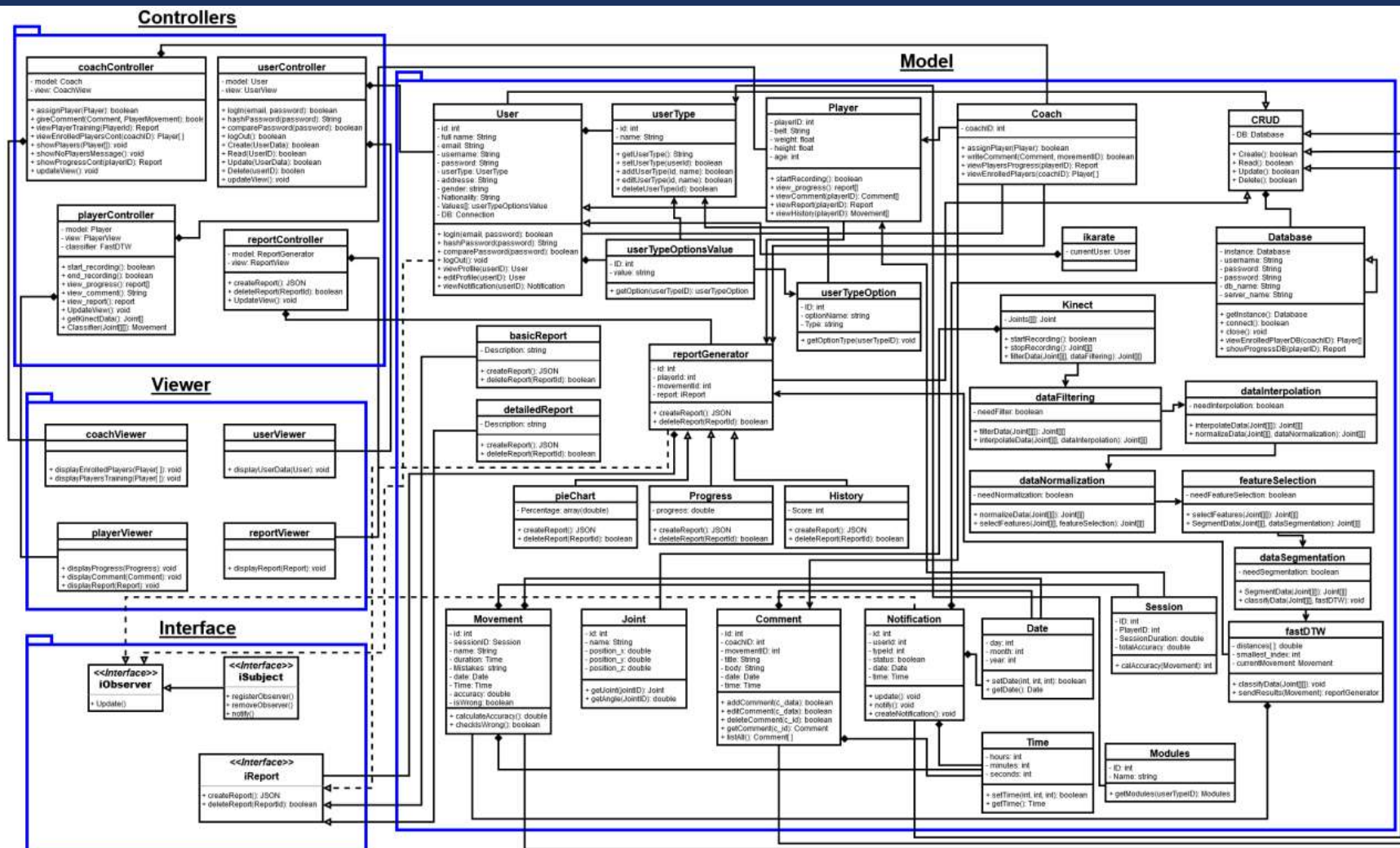
Recording & Pre-processing & Processing Sequence Diagram



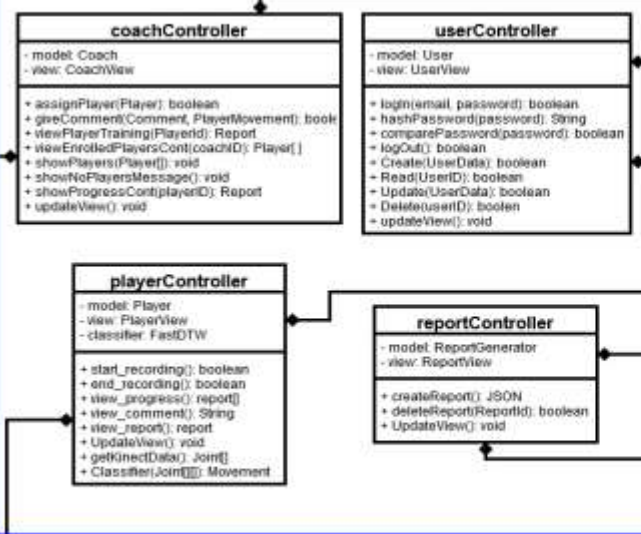
Recording & Pre-processing & Processing Sequence Diagram



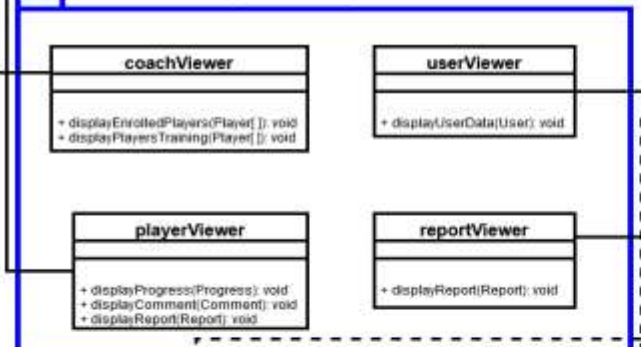
CLASS DIAGRAM



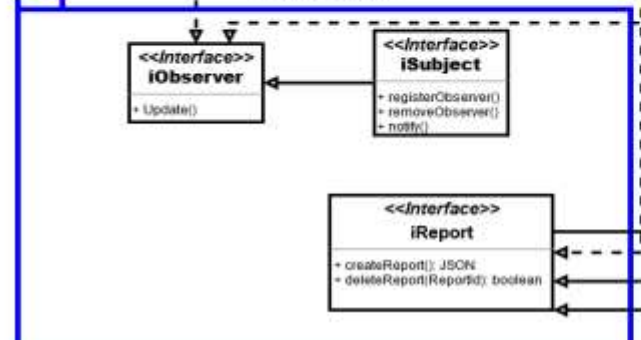
Controllers



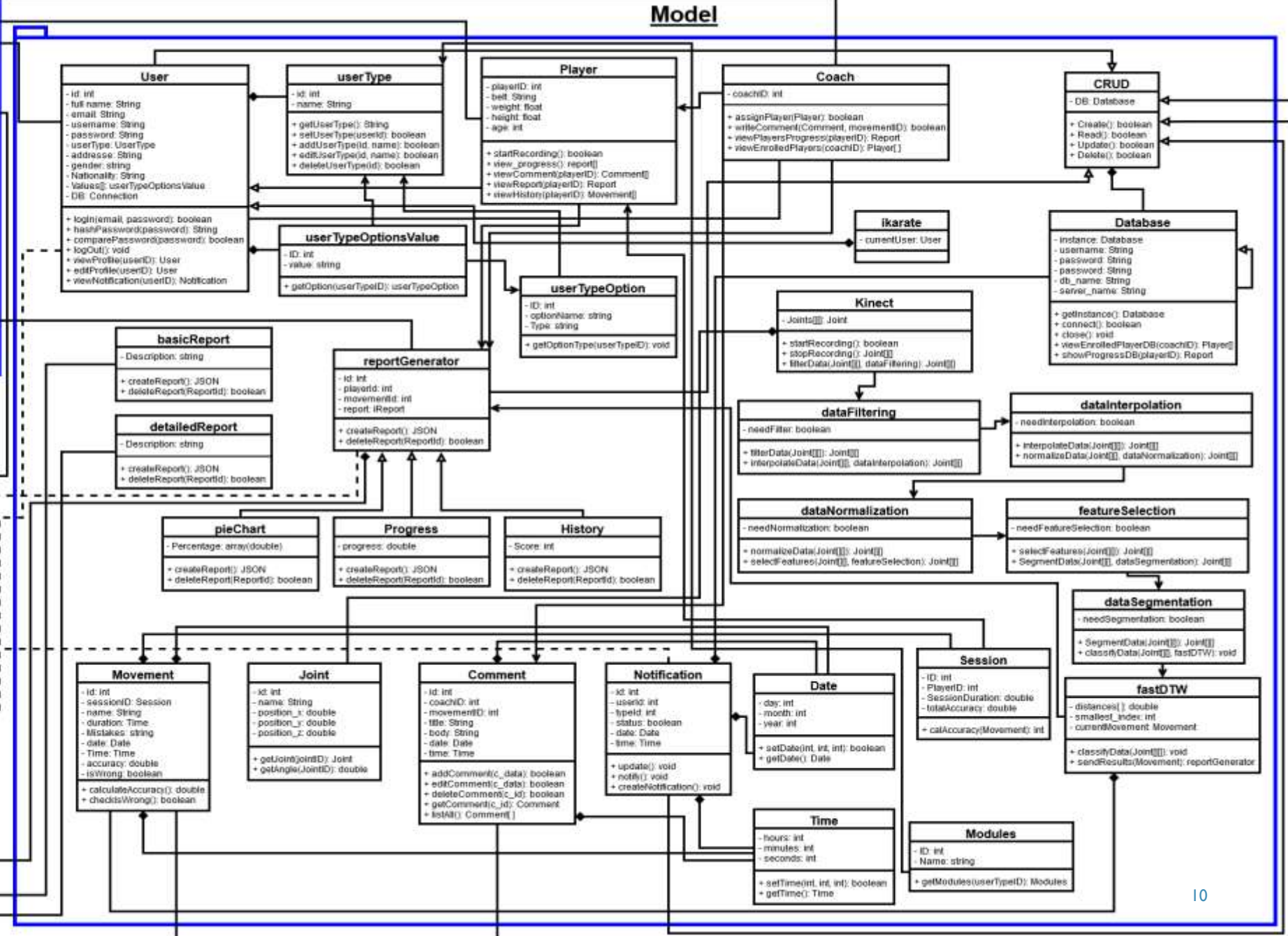
Viewer



Interface



Model



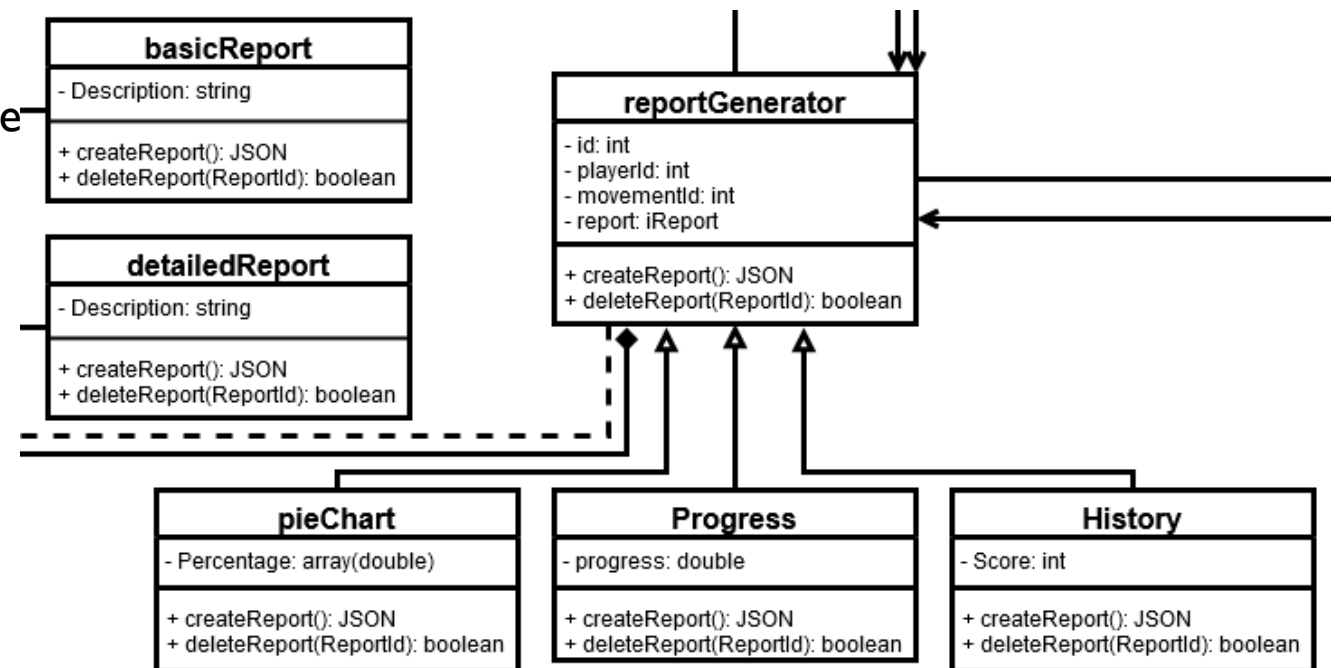
DECORATIVE DESIGN PATTERN

□ Intention:

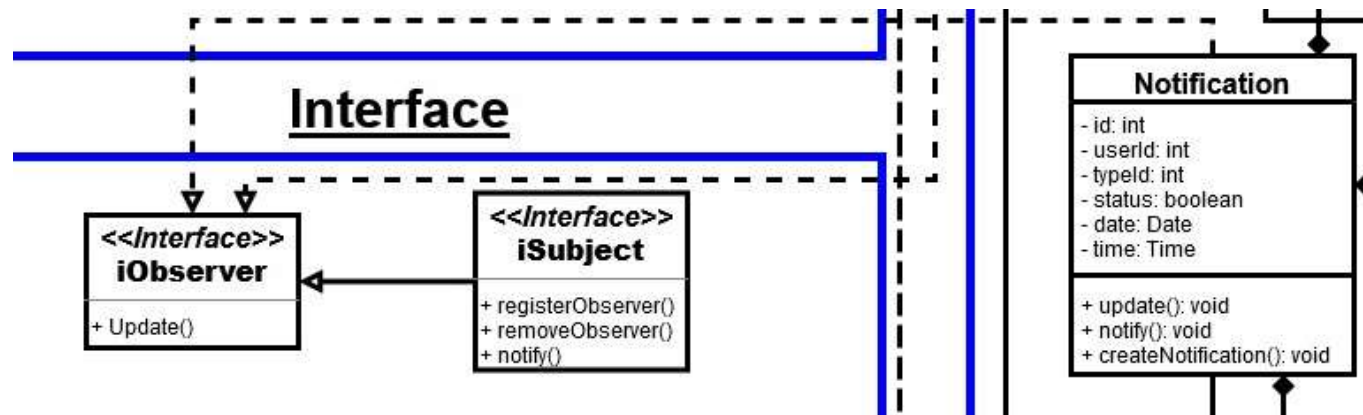
- Attach additional behavior or state to entire class.

□ Usage:

- Creating dynamic report system for better customizations.



OBSERVER DESIGN PATTERN



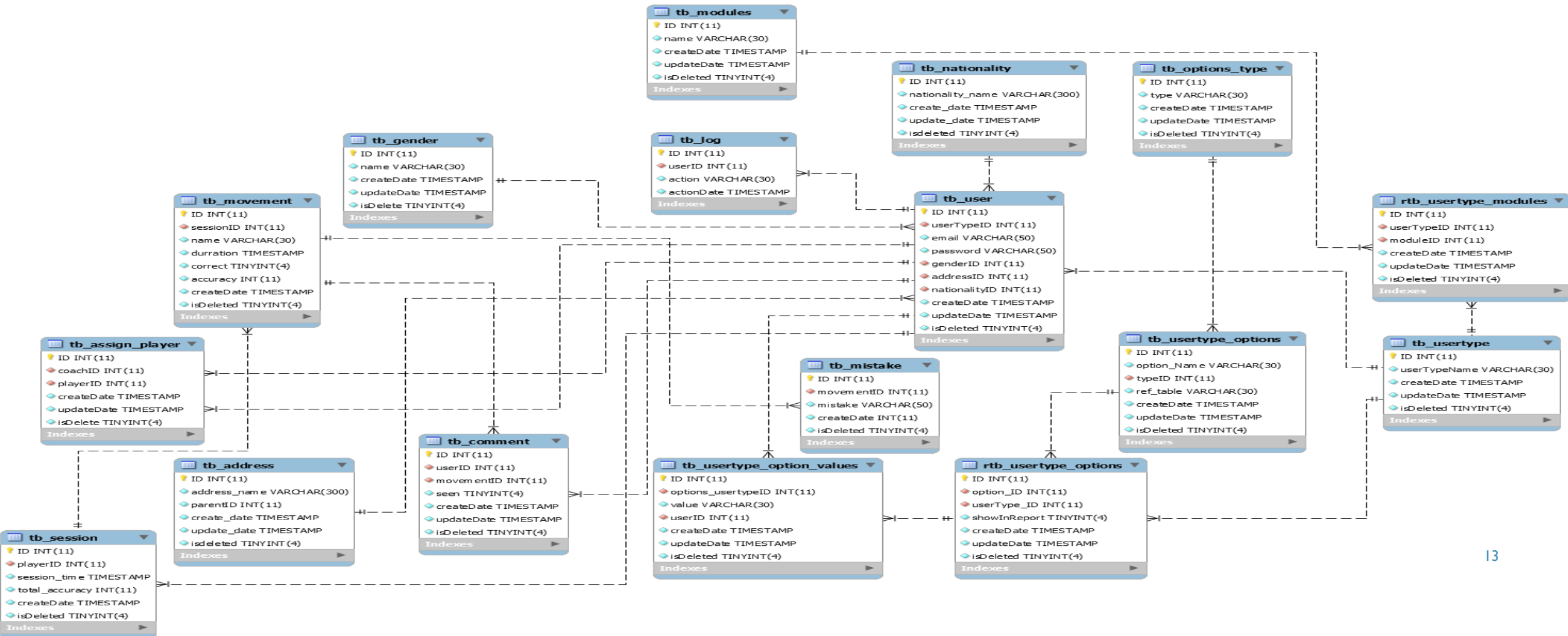
□ Intention:

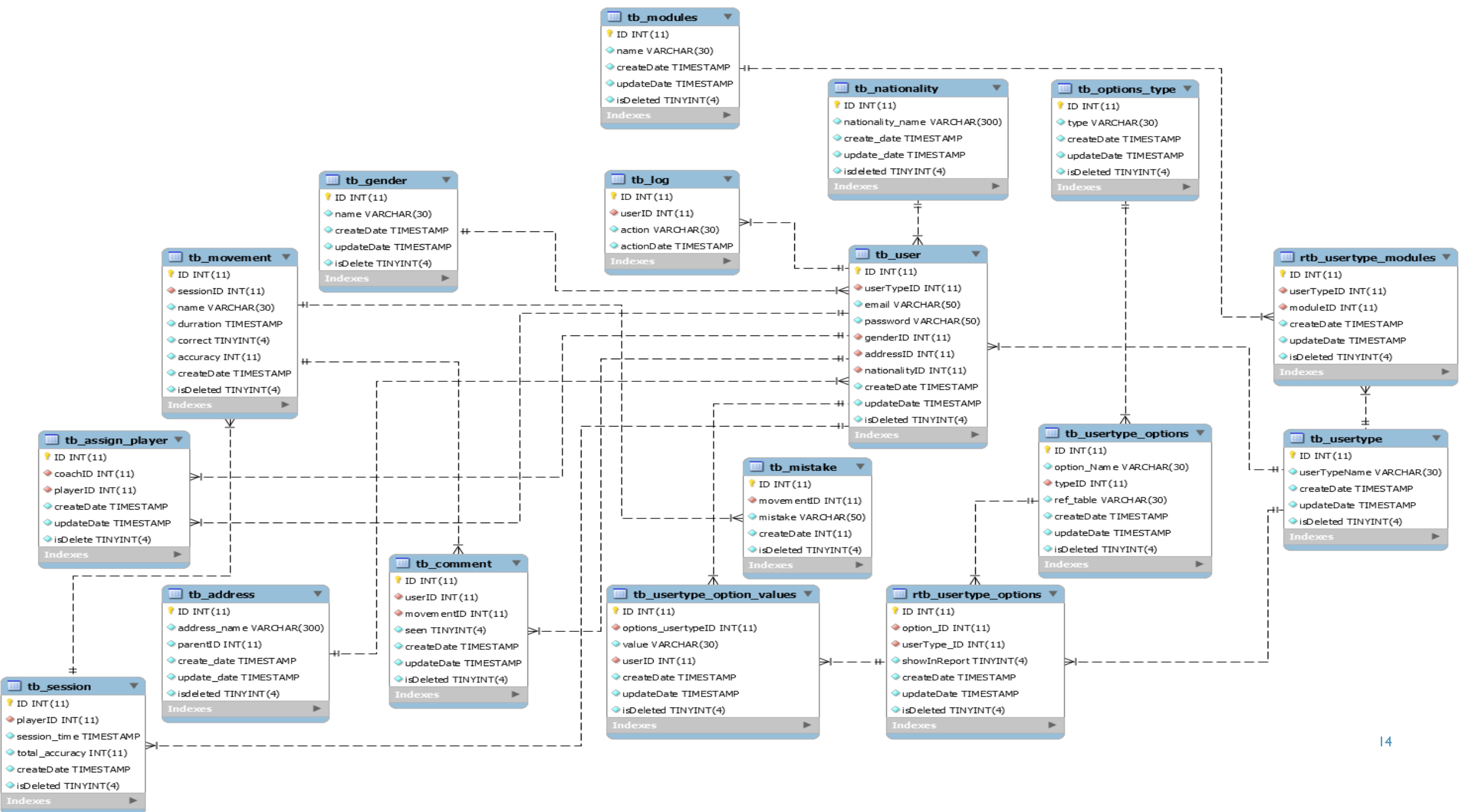
- Define a one-to-many relation between objects so when an object changes its state, all other dependents are updated automatically.

□ Usage:

- To automatically notify users with any comment on their moves.

DATABASE DIAGRAM



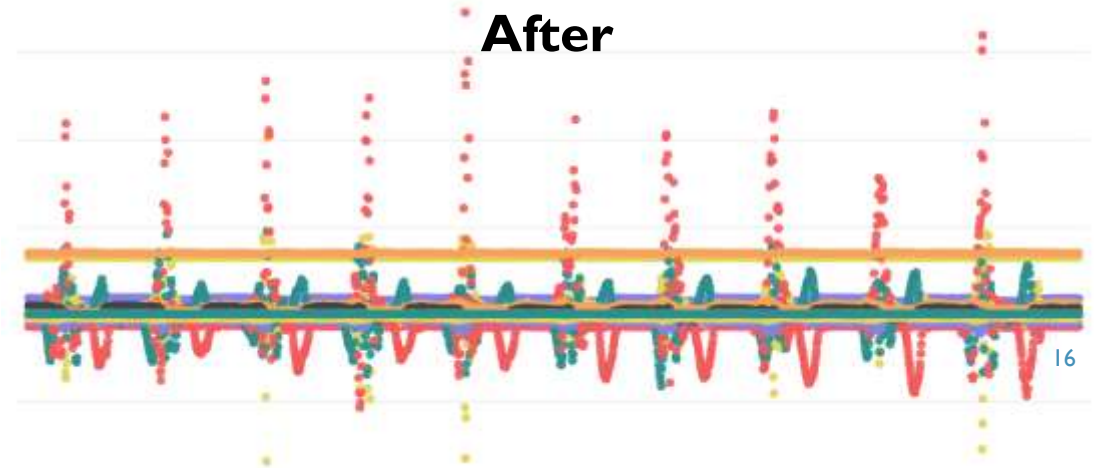
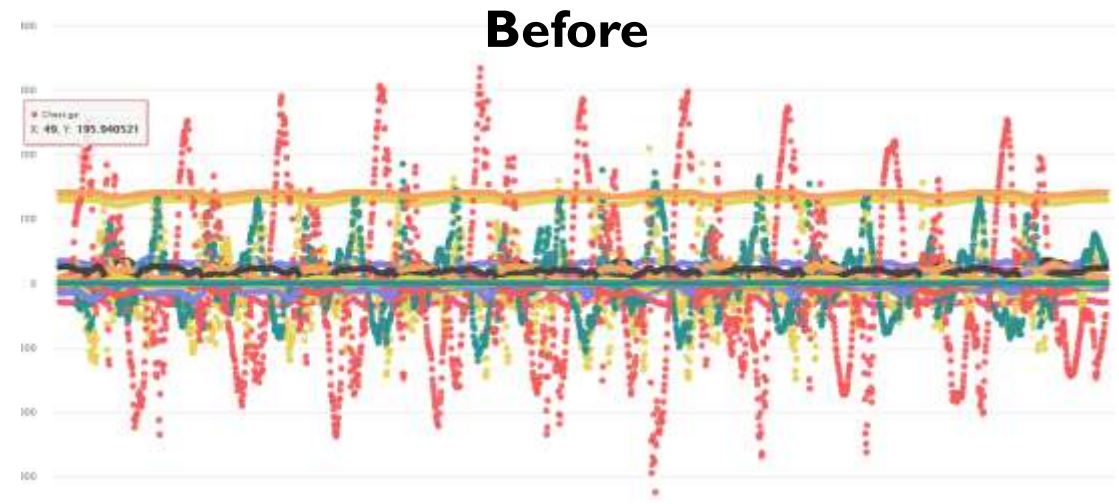


□ Algorithms:

- KNN (**Unused**): Can be used to solve both classification and regression problems but becomes significantly slower as the size of that data grows.
- FDTW (**Used**): Able to find an accurate approximation between two time series.

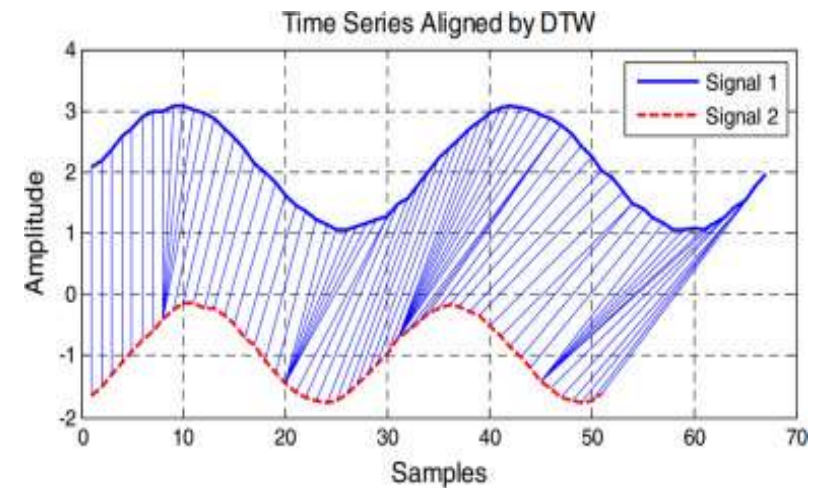
PRE-PROCESSING

- Get Xbox Kinect(s) Readings.
- Data Filtering.
- Data Interpolation.
- Data Normalization.
- Feature Selection.
- Data Segmentation.



❑ Fast Dynamic Time Warping:

- Is an algorithm for measuring similarities between two signals.
- Signals may vary in speed.
- Ecludian equation was used to compute the distance.



EXPERIMENTS

- ❑ The system has been tested with a Karate player from Al Ahly Sporting Club.
- ❑ **The system has been tested on the following moves:**
 - 1) Age-Uke.
 - 2) Mae-Geri.
 - 3) Gedan-Barai.
 - 4) Soto-Uke.
- ❑ The player made each move and its common mistakes 10 times.



RESULTS

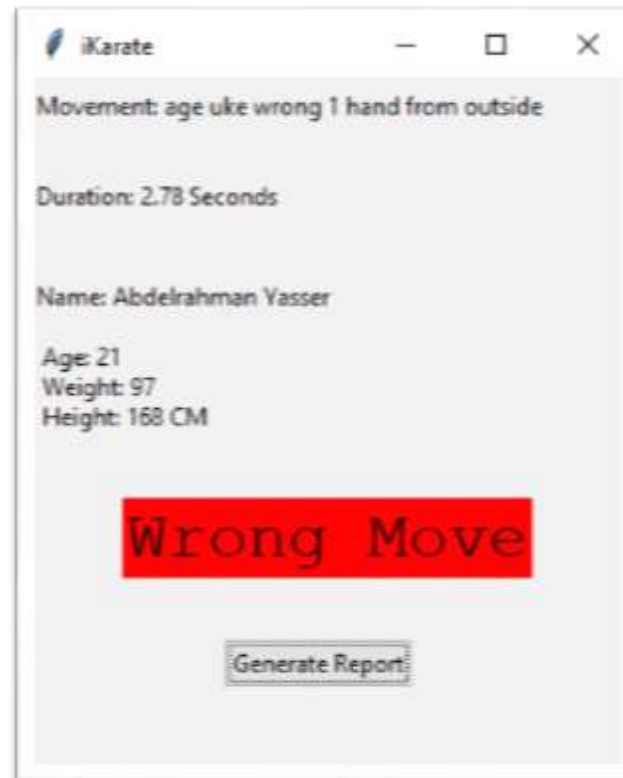
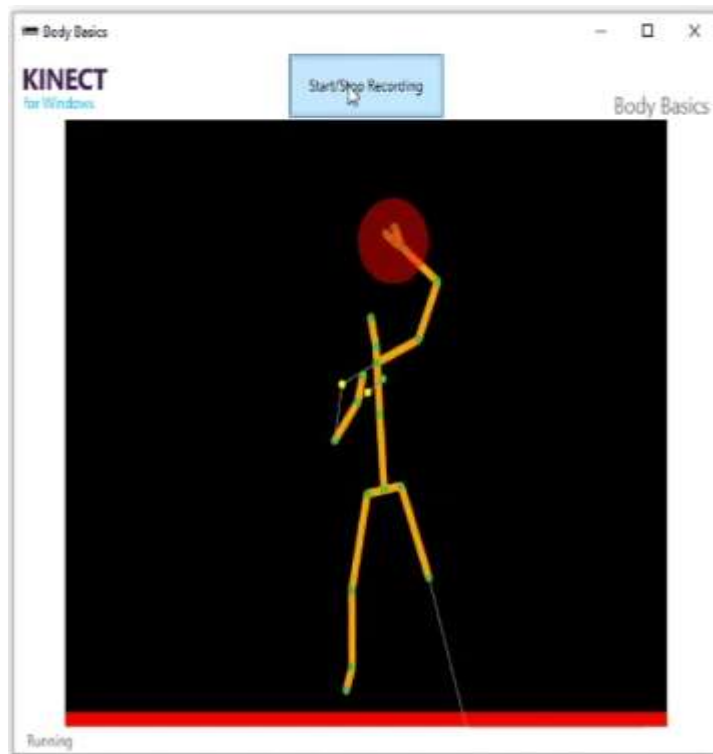


- ❑ The average accuracy is 90%.
- ❑ We noticed that accuracy decrease with leg moves.

IKarate			
Name: Abdelrahman Yasser Age: 21 Weight: 97KG Height: 168CM Belt: Black			Date: 03/03/2020 21:42
Movement	State	Mistake	Accuracy %
Age-uke	Wrong	Hand curve was from outside	60
Age-uke	Wrong	Short leg angle	57
Gedan Brai	Right	None	100
Mae Geri	Wrong	Straight Leg	67
Mae Geri	Wrong	Lose hand	76

This table Shows all movement done in session with their accuracy and mistakes

GUI (GRAPHICAL USER INTERFACE)



iKarate

Name: Abdelrahman Yasser Date: 03/03/2020 21:42
Age: 21
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PAPER SUBMISSION & ACCEPTANCE



ELSEVIER



Ambient Systems, Networks and Technologies Conference

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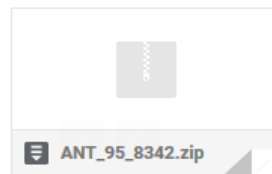
Bassel Emad <basselemad247@gmail.com>
to Ayman, Nada, Ayman, Omar1603910, cr.submit ▾

Mon, Feb 10, 5:27 PM (4 days ago)

Dears,

Please find the attached file below regarding ANT Camera Ready submission for the paper "iKarate: Improving Karate Kata", ID: 95, Transaction ID: 8342.

Best Regards



Camera Ready
to me ▾

Mon, Feb 10, 7:13 PM (4 days ago)

Dear Author,

Thank you for submitting your camera-ready files.

Regards,
Camera-ready Team



of exploration and excavation among the cities of Lycia, especially by Sir Charles Ross, who in 1846 brought back the remarkable statues now in the Lycian Room at the British Museum. The linguistic affinities of the Lycian language are as yet not certainly determined. See Bergström, *Beiträge zur Erklärung der lykischen Sprache* (1875-78). The few Lycian inscriptions collected in the *Corpus Inscript. Lat.* See Treubner, *Geschichte der Lykier*. See APOLLO.

Lycōris. See

Lycosūra

the slope

(viii)

RESEARCH PAPER



to have... was allowed the privilege of dining in the Pryneum. This decree, which was proposed by Stocles, has come down to us at the end of the list of the Ten Orators. Lycurgus is said to have published fifteen orations, of which only one has been preserved. This oration, which was delivered in 331, is an accusation of Leocrates (*Karà Λεοκράτη*), as Athenian citizen, for abandoning Athens during the battle of Chaeronea, and settling in the Grecian State. The best editions of Lycurgus are those of Osann (Jena, 1821), Mätzner (1833), and Meier (1847), Rehdantz (1876), and (1880). See also Dürrbach, *L'Orateur* (1890). Another excellent text is that of his *Oratores Attici*. The oration is also found in the collections of Reis

(1) Son of Poseidon and married to Dirce. He assumed the name of his brother Nyctimus; and, after his death, he was called Lycurgus. He was a famous orator.

DELL PHASE ONE ACCEPTANCE



DELLTechnologies

Envision The Future

From: EnvisiontheFuture <EnvisiontheFuture@emc.com>

Date: January 31, 2020 at 4:01:42 PM GMT+2

Subject: Result of Dell Technologies Envision the Future – Graduation Project Competition

Dell Customer Communication - Confidential

Dear Professor and Team Leader,

Congratulations! Your team's Graduation Project Abstract has been shortlisted for moving to the next phase of the Dell Technologies Envision the Future Competition. This decision is based on the blind evaluation of a panel of distinguished experts who have reviewed the 227 project abstracts that we have received from more than 100 universities, representing 14 countries among the region with total participation number of 1,019 students.

Your team is expected to develop and submit a Design report and a video by Thursday Sunday 1st of March.

You will be receiving further information from our side in order to help you in your work. You will receive a more detailed mail about we need in the video and the report in the next few days. Now you can enjoy the news and celebrate with your teams for making it to the next phase

As part of our responsibility, we are sharing with you the blind feedback received as it is from the reviewers from outside the region, in order to help you better implement your project. You can check it on your account on the [competition website](#) .

The Steering Committee wishes you good luck and continued success!

Best regards,
Competition Steering Committee

DELL FEEDBACK



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Online Application	Submission Title	Feedback	Action
Abstract Submission	iKarate: Improving Karate Kata	<ul style="list-style-type: none">The proposal presents a virtual recognition device to capture movements for training in Karate. The proposal presents necessary details from which it is evident that they have a clear understanding of the end product.Answers of question 1 and question 2 are almost the same (repeated information). What is virtual recognition device? From this description, it is not clear if this project will be useful and practical or not.	Qualified
Design Report	N/A	N/A	<input checked="" type="checkbox"/> Apply

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Any
questions ?

**THANK
YOU!**