CAPSTONE PROJECT REPORT

(Project Term January-May 2021)

(A Novel Pulse Detection by Extracting Images Using Web Cam)

Submitted by

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Course Code: CSE445

Under the Guidance of

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DECLARATION

We hereby declare that the project work entitled ("**Pulse Detection Using Web Cam"**) is an authentic record of our own work carried out as requirements of Capstone Project for the award of B. Tech degree in Computer Science & Engineering from Lovely Professional University, Phagwara, under the guidance of Mr. Mamoon Rashid, during January to May 2020. All the information furnished in this capstone project report is based on our own intensive work and is genuine.

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1. NOVELTY

Main concept of the project is to find the heart rate of a person using webcam. Mostly to determine their mood, analyze their bpm and diagnose the person with proper care.

2. DESCRIPTION

- This project mainly focuses on the image of a person, so we are using open cv which is python library.
- OpenCV is also a software which is now used in traffic control, self-driving cars etc.,
- Heart rate of a person is shown in the console in digital signal which are normally converted from mechanical signals.

2.1 FEATURES

- We can see heart rate in bpm.
- Accuracy depends on the many features like clarity of the image, image noise, etc.
- Cost efficient.
- Time efficient.
- No prior knowledge required to use this application.

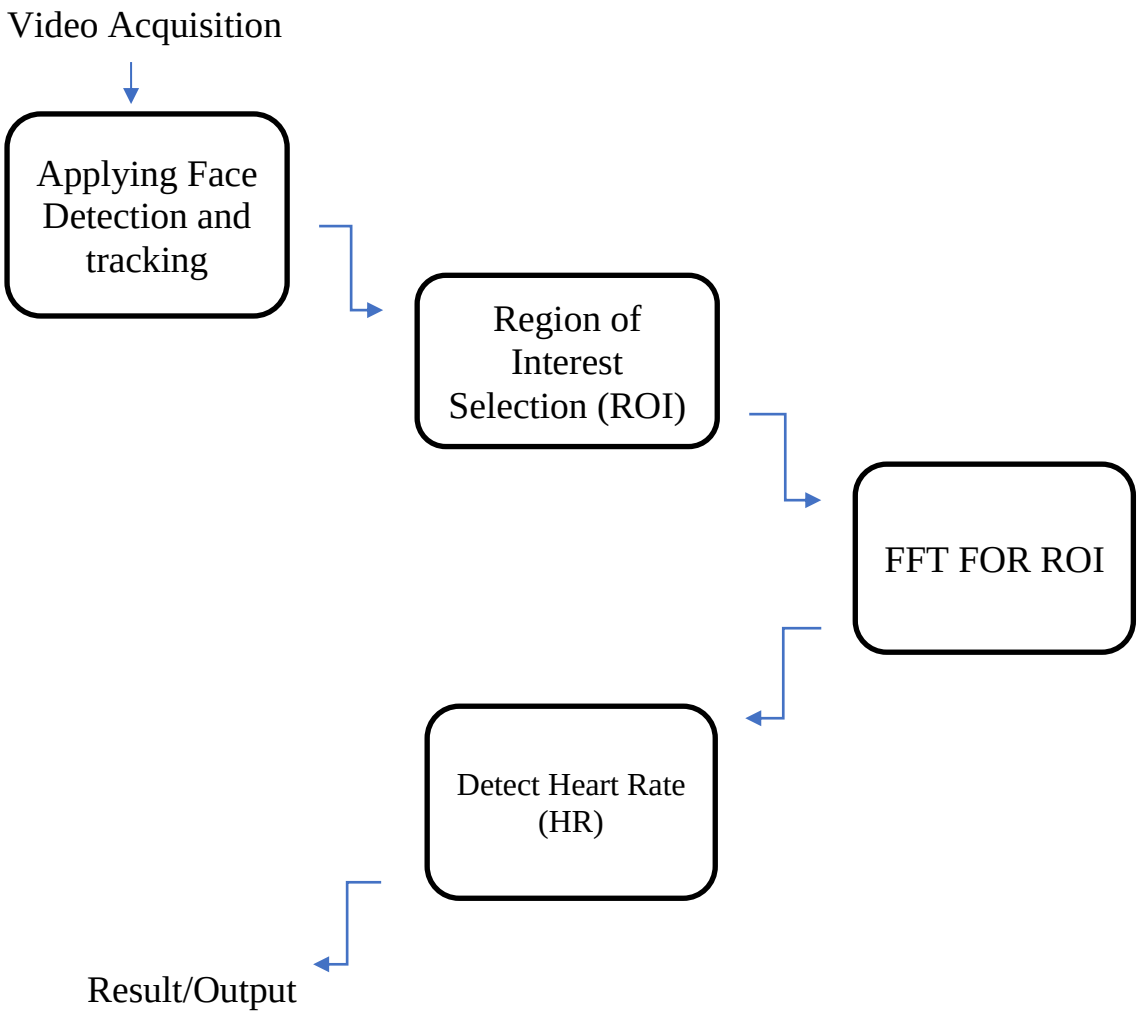
2.2 SPECIFIC REQUIREMENTS

- For getting Heartbeat of a person, we must let him/her face a web camera for at least 15-30 seconds.
- There should be minimum noise and person should be free from gasping.

2.3 WORKING

Person should face camera for few seconds, a green rectangular area is formed on the forehead of a person in the image. Here OpenCV observes the movement of skin which is formed by movement of blood vessels under the skin, it then fetches the mechanical waves and cover them into digitals waves and displays the results in the form of **bpm** on the user console.

The most prominent would be to apply it for other cases, for example, skin care, mood detector, treatment of wounds and many more.



FFT is an algorithm used to for frequency representation.
ROI is a technique used for selecting frames and reducing the noise in the image.

3. NOVELTY

So far, we have come across this idea with only detecting heartrate, the same application can be used for different areas of the body. What our group is trying to achieve different is to use the application in a diagnostic way and help people know about their health accurately and immediately. Our primary focus is the algorithm used in detection and secondary focus is to deploy in a cloud environment and make it accessible to all via an application.

4. FEASABILITY

With the machinery at hand, it would be easy to implement such task, but to refine it and make it more understandable would be a time taking process. But our main intentions are to build a working prototype of the idea we have in mind and apply it to an application.

For developing this project there should be basic knowledge of sensors and working of Machine Learning/ Deep Learning, sufficient capability to code in MATLAB, OpenCV and its libraries.

5. RESEARCH GAP

With the idea in mind, going forward is surely an enormous task, but the challenges ahead are trivial. Some of them are listed below:

1. Cannot train large datasets to analyze different scenarios.
2. Often limited by perception of the idea, new and regular implementations may render our work in the long run.
3. To fully develop the idea, would be to have a basic understanding of the latest technologies and in doing so requires an ample amount of a person's time which is unfortunately unavailable.

6. OUTCOME

The result or outcome of this project is very simple. To detect the bpm of a person and give a detailed report for that person. Our application is just away from a tap on the phone. Easy acquirable and usable. The main focus is to device an application and recent study shows that it can be even implemented in device whose primary objective is used for detection.