Activity Detection for Monitoring the Level of Physical Activity in People

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Introduction

- The widespread presence of obesity in the US is **35%** among adult men and **40%** among adult women [1]

- Determining the amount of physical activity is necessary for achieving specific health benefits

- It has been hindered by the lack of precise instruments for monitoring physical activity.

Trends in adult overweight, obesity, and extreme obesity among men and women aged 20–74: United States, 1960–1962 through 2013–2014

[1] https://www.niddk.nih.gov/health-information/health-statistics/overweight-obesity
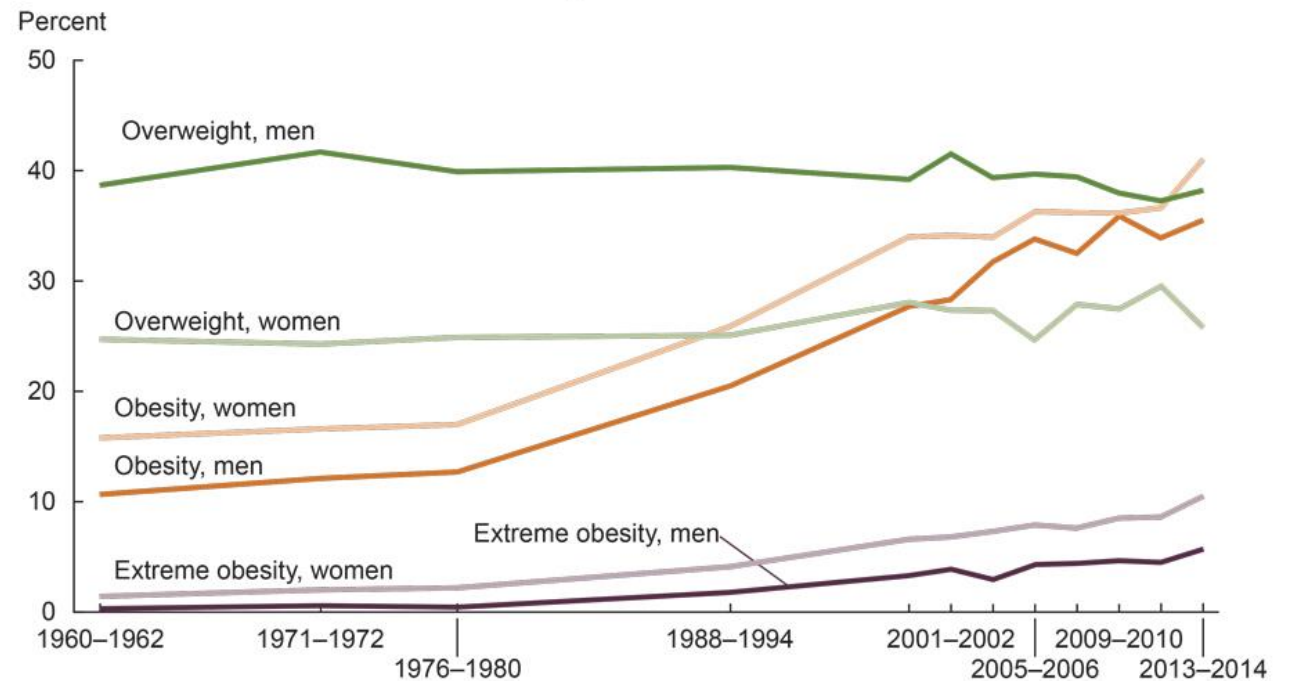
Users

- **The users of this project can be either health professionals or individuals**

- My aim for this project is to detect the actions being performed by the user in order to monitor the level of physical activity a person is performing.

- This information can be evaluated by a health professional

- Following more effective and personalized activity recommendations would help us to reverse the spread of adverse health conditions

Proposed Approach

- Deep learning has been utilized to address some challenges in human activity recognition that includes [1]:

  - Automates feature extraction

  - The diverse structure of deep neural networks allows to encode features from different angles

  - CNNs enable us to work with multimodal data

  - RNNs are well suited for modeling sequences of data.

[1] https://arxiv.org/pdf/2001.07416.pdf

Dataset: PAMAP2 Physical Activity Monitoring Data Set

- 18 different physical activities (such as walking, cycling, playing soccer, etc.)
- 9 subjects
- wearing 3 inertial measurement units and a heart rate monitor.