Incredible Blood Pressure-inator 2000

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Goal

❏ This project is aimed to help people understand the importance of their blood pressure readings.

❏ By implementing a person's gender, age, height and weight, the application would be able to provide extensive analysis of one's systolic and diastolic blood pressures.

❏ We want to give users a comprehensive understanding of their blood pressure readings and how it relates to their health.

Motivations and Objectives

❏ Motivations

- About 1 in 3 American adults have high blood pressure

- Many people are unaware that their blood pressure is high because they associate their blood pressure numbers with a much broader average

- Irregular blood pressure levels may lead to many serious health conditions in the immediate future

❏ Objectives

- Compile a person's data within the application (Gender, Age, Height, Weight)

- Analyze the data and produce an insightful response to one's personal health based on their blood pressure readings
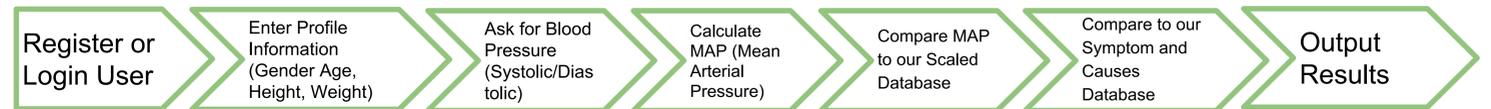
Research Challenges

❏ Initially, one of our main goals was to create a physical blood pressure monitoring device which ultimately failed due to various reasons. This lead us to buying a pre-made device.

❏ We attempted to automatically connect the pre-made blood pressure monitoring device to the application using a Bluetooth device.

❏ However, the purchased device was not compatible with our current app builder, even after a contact with the developer.
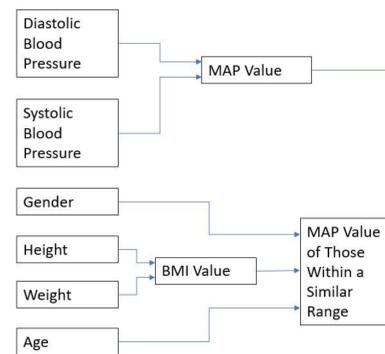
Acknowledgement

We would like to thank Dr. Franke Hubertus (IBM), Dr. Hana Godrich and Peri Akiva for guiding and assisting us throughout this project.
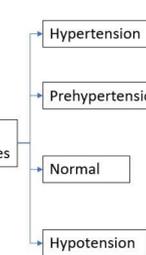
Methodology

Register or Login User → Enter Profile Information (Gender Age, Height, Weight) → Ask for Blood Pressure (Systolic/Diastolic) → Calculate MAP (Mean Arterial Pressure) → Compare MAP to our Scaled Database → Compare to our Symptom and Causes Database → Output Results
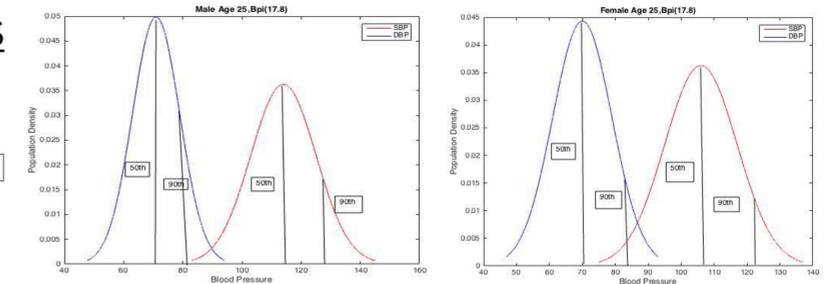
$$MAP = \left(DBP + \frac{SBP - DBP}{3}\right)$$

A comprehensive analysis is conducted to compare the user's blood pressure numbers to the database's numbers, which contain the empirical mean of many people of similar age, gender and BMI.

INPUTS

OUTPUTS

The graphs above represent the bell curve for the age group of 25-30yrs. (male and female). These are average systolic and diastolic blood pressure readings that were computed from many reliable test subjects. Each user's input data is compared to these averages and analyzed to determine if the user's blood pressure range is in the safe zone or not.

Results
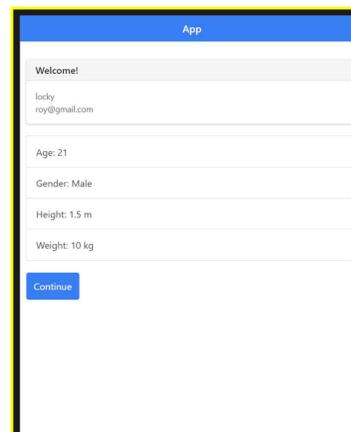
Example representation of the profile input in order to generate a profile of the user for better analysis.

Example result page that displays the user's MAP (Mean Arterial Pressure) value. Based on the MAP value, our app shows possible causes and symptoms. This example represents a male, 45 years old, with a BMI of 30+.
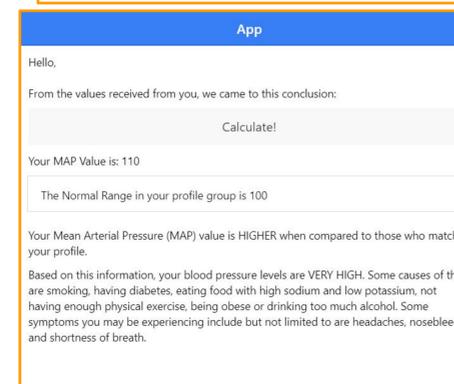
Consolidated scale of MAP data gathered through research based on Gender, Age, and BMI.

MALE	AGE	BMI	MAP	FEMALE	AGE	BMI	MAP
	20-25				20-25		
under		17-20	85.66666667	under		17-20	82
average		20-25	87.66666667	average		20-25	85
over		25-30	91	over		25-30	86
obese		30+	93	obese		30+	89.66666667
	25-30				25-30		
under		17-20		under		17-20	84.33333333
average		20-25	89.33333333	average		20-25	89.33333333
over		25-30	92.66666667	over		25-30	92.66666667
obese		30+	95	obese		30+	94.33333333
	30-35				30-35		
under		17-20	87.66666667	under		17-20	86.66666667
average		20-25	90.66666667	average		20-25	88
over		25-30	94	over		25-30	91.33333333
obese		30+	96.66666667	obese		30+	94.66666667
	25-40				35-40		
under		17-20	89	under		17-20	88.66666667
average		20-25	92.33333333	average		20-25	90.66666667
over		25-30	94.66666667	over		25-30	90.33333333
obese		30+	96.66666667	obese		30+	96
	40-45				40-45		
under		17-20	90.33333333	under		17-20	90.33333333
average		20-25	93	average		20-25	94.66666667
over		25-30	97	over		25-30	94.66666667
obese		30+	100.3333333	obese		30+	96
	45-50				45-50		
under		17-20	91.33333333	under		17-20	93.33333333
average		20-25	94	average		20-25	95.66666667
over		25-30	98.33333333	over		25-30	97.33333333
obese		30+	101	obese		30+	101
	50-55				50-55		
under		17-20	92.66666667	under		17-20	95
average		20-25	95.33333333	average		20-25	97
over		25-30	99.33333333	over		25-30	
obese		30+	102.6666667	obese		30+	102.3333333
	55-60				55-60		
under		17-20	93.66666667	under		17-20	96.33333333
average		20-25	96	average		20-25	98.66666667
over		25-30	100.6666667	over		25-30	100.3333333
obese		30+	104.3333333	obese		30+	103.6666667
	60-65				60-65		
under		17-20	94.66666667	under		17-20	98.66666667
average		20-25	98	average		20-25	101
over		25-30	102	over		25-30	102.3333333
obese		30+	105.3333333	obese		30+	105.3333333

References

[1] Hosseini, Mostafa, et al. "Blood Pressure Percentiles by Age and Body Mass Index for Adults." *EXCLI Journal*, Leibniz Research Centre for Working Environment and Human Factors, 24 Mar. 2015, www.ncbi.nlm.nih.gov/pmc/articles/PMC4553889/.

[2] "Division for Heart Disease and Stroke Prevention." *Centers for Disease Control and Prevention*, Centers for Disease Control and Prevention, 16 June 2016, www.cdc.gov/dhdsp/data_statistics/fact_sheets/fs_bloodpressure.htm.