The FocusBot Solution

Enhancing Software Developer Productivity

Michael Pang	Ajay Seethana	Matthew Topping	Elijah Tynes
Department of Computer Science Virginia Polytechnic Institute and State University Blacksburg, Virginia, USA michaelp03@vt.edu	Department of Aerospace and Ocean Engineering Virginia Polytechnic Institute and State University Blacksburg, Virginia, USA ajayseethana@vt.edu	Department of Computer Science Virginia Polytechnic Institute and State University Blacksburg, Virginia, USA mctopping@vt.edu	Department of Computer Science Virginia Polytechnic Institute and State University Blacksburg, Virginia, USA elijaht@vt.edu

ABSTRACT

As software engineering is currently being driven by humans, adverse human factors will affect the quality of the software being developed. As the demands on software engineers increase, the neglect of essential self-care will lead to adverse health effects, such as dehydration, fatigue, eye strain, and more. The following proposal aims to present an enterprise-level solution that is designed to monitor for signs of these adverse health effects and address them in real time. The system will track user behavior using on-device sensors and external fitness devices, and using health-based algorithms, be able to provide timely alerts and recommendations to the user. This system aims to improve the user's well-being, reduce burnout, and improve their overall software engineering performance.

INTRODUCTION

As software engineering remains a human-driven field, various human factors can negatively impact the quality of software produced. As demands on software engineers intensify, developers will tend to neglect essential self-care, manifesting health issues like dehydration, fatigue, eye strain, and more. Studies have shown that these negative health issues will affect the developer's performance and well-being.

Numerous UK studies, as presented by Cigna healthcare, attribute poor physical and mental health to lower levels of productivity in the workplace (costing the UK economy around $180 billion dollars per year). Furthermore, the research concluded that promoting a work-life balance improved productivity in the workplace. As such, a means of improving the quality of life for software engineers is necessary to ensure high productivity and work satisfaction.

RELATED WORK

Relevant software engineering tools that we found while researching our topic include RescueTime, Stretchly, StandApp, and EyeLeo. Each of these tools is specifically geared towards reminding software engineers to take breaks from their work, which is one of our main purposes for our project. For example, Stretchly and StandApp notify the users to take breaks throughout the day, prescribing them with options for different activities to perform while they take their break to maintain a healthy lifestyle.

Another software engineering tool that was relevant to our purpose was WorkRave. WorkRave is a program that assists in the recovery and prevention of different injuries, like Repetitive Strain Injury (RSI), Carpel Tunnel Syndrome, and myopia. This is relevant to our project, since one of our purposes is to help software engineers avoid worsening their physical health conditions by reminding them to avoid a sedentary lifestyle.

In a study by Cigna Healthcare in 2023, it was discovered that "the total cost to the UK economy of lost output among working-age people due to ill health is around $180 billion per annum, equivalent to 7% of GDP ... productivity is by far the most significant aspect ... lack of productivity is almost twice as costly as the others combined... these costs are rising – in fact they have risen by around 60% since 2016" (*Healthy employees are more productive*). This shows how important it is for employees to take breaks throughout their schedule to avoid declines in physical and mental health, which is the main purpose of our project.

SOFTWARE ENGINEERING PROCESS

For our project, we have chosen to follow the Agile software engineering process. To be more specific, we intend to use the Prototyping Model as our software engineering process. This methodology allows for more flexibility and continuous iteration. Feedback is also essential for the development of FocusBot, which is aimed at improving the efficiency of software developers. Receiving feedback from the consumers on our design will allow us to figure out what changes are necessary to improve the software. Agile's iterative nature aligns well with our goal of creating a user-centered product that adapts to the needs and behaviors of our target audience.

We will start by identifying core features like break reminders, movement suggestions, and hydration tracking. This will include experimenting with preexisting health metrics provided by systems such as smart watches. After each design modification we make, we will conduct usability testing and gather feedback to refine the product's functionality and design. The design changes will be heavily based on user feedback and team input.

REFERENCES

[1] Anon. Healthy employees are more productive. Retrieved September 27, 2024a from https://www.cignaglobalhealth.com/eu/your-health-plan/productivity/healthy-employees-are-more-productive

[2] Anon. Improving software developer mental well-being and productivity. Retrieved September 27, 2024b from https://www.informatics.uci.edu/8098-2/

[3] Anon. Stack overflow developer survey 2022. Retrieved September 27, 2024c from https://survey.stackoverflow.co/2022/#developer-profile-demographics