

## Incorporating AI in Prosthetic Limb Development

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The goal of this proposal is to use artificial intelligence (AI) to create an innovative and complete method of reducing the prices of prosthetic limbs. Prosthetic limbs are crucial towards helping people who have lost a limb, in regaining their mobility and independence. Unfortunately, the exorbitant expense of these devices occasionally prevents many people in need of competent prosthetics from having access to them. The suggested method states that by incorporating AI-driven technology into numerous components of the design, production, and matching processes, prosthetic limbs can be made affordable while not sacrificing functionality.

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## **Introduction**

~~In a world that constantly pushes the boundaries of technological innovation, the realm of healthcare is no exception.~~ Prosthetic devices have developed over time from simple wooden constructions to extremely complex, highly customizable engineering marvels. These incredible inventions have the capacity to change the lives of limb-loss victims by giving them back their freedom and mobility. For many people in need, the expense of prostheses continues to be a major obstacle. This essay will examine the urgent need to lower the cost of prosthetics, looking at the obstacles people face, the state of prosthetic affordability today, and the creative solutions that could lead to a day when everyone has access to these game-changing devices.

## **Project description**

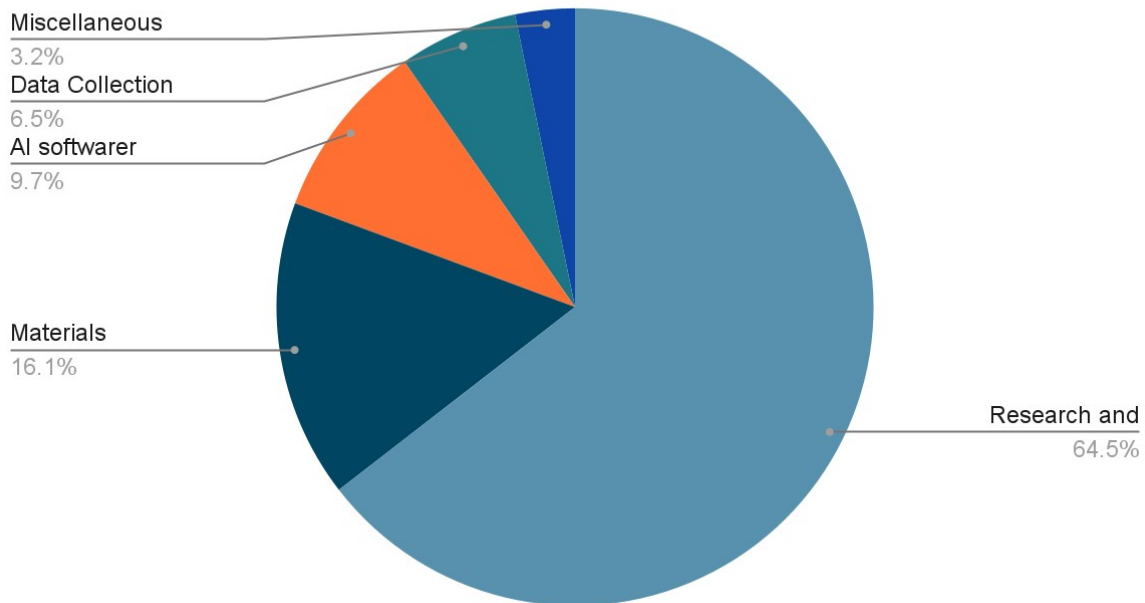
The financial burden associated with prosthetics is a staggering challenge that countless individuals, particularly amputees, grapple with in the United States. The fact that the vast majority of amputees receive no meaningful concessions from the American medical system serves as evidence. Unless they are quite basic, prosthetic arms and legs usually cost more than \$60,000. Prosthetic devices are financially unattainable for a considerable proportion of the population due to their initial cost. The financial difficulties don't end there, either. The expense of replacing replacement parts for prosthetic devices can run into the thousands, adding to the burden on finances. The fact that insurance only covers a small portion of the total cost of these limbs and spare parts is even more depressing. This glaring disparity leaves amputees and individuals in need of prosthetics in a precarious position, forced to grapple with overwhelming expenses for a fundamental aspect of their well-being. The sheer inadequacy of insurance coverage serves as a testament to the dire need for a systemic shift in the affordability of prosthetic devices to ensure that they are accessible to all who require them.

The utilisation of 3D printing technology in the prosthetics domain presents numerous advantages, indicating its capacity to transform this area. Reducing prototyping expenses significantly is one of 3D printing technology's most significant and spectacular benefits for product development. Prototypes that would often cost hundreds of dollars may often be produced for a fraction of that price, enabling even the most modestly funded enterprises to continuously pursue product development. The experience of Hartfiel Automation, which was able to use 3D printing technology to lower prototyping costs from an average of \$125 to just \$4 per component, provides an interesting example of this cost-saving potential. Such significant cost reductions are particularly noteworthy in the context of prosthetics, where affordability has long been a major challenge.

Moreover, 3D printing can significantly accelerate the product development process in addition to serving as a cost-controlling instrument. Traditionally, companies that were creating products would use professional prototype developers to construct more sophisticated functioning prototypes after producing basic mock-ups during the design phase. Prototype development and outsourcing can be time-consuming processes. By comparison, items can be produced straight from computer design files as soon as they are finished with 3D printers such as the Ultimaker S5 Pro Bundle or the Ultimaker S3. As a result, with 3D printing technology, tasks that would take weeks to complete through a traditional prototype developer may be completed in a matter of hours. In the field of prosthetics, this expedited development timeframe has the potential to revolutionize the field by enabling more rapid iterations and customisation to match the specific requirements of each amputee.

## Budget

### Estimated Budget



*Figure 3.4.2 The estimated budget for the project*

- Research and Development: \$200,000
  - This includes funding for a small team of engineers, AI experts, and prosthetic specialists working on the project.
- Materials and Prototyping: \$50,000
  - Covering costs for materials, 3D printing, and prototyping of prosthetic components.
- AI Software and Tools: \$30,000
  - Licensing AI software, tools, and cloud computing resources for AI development and implementation.
- Data Collection and Analysis Tools: \$20,000
  - Software and hardware tools for data collection and analysis related to prosthetic performance.

- Miscellaneous Expenses: \$10,000
  - Contingency, travel, and other incidental costs.
- Total Estimated Budget: \$310,000

## **Conclusion**

In this proposal, the goal is to use artificial intelligence (AI) such as 3D printing technology to create an affordable and complete method of making prosthetic limbs. The high cost of prosthetic limbs often prevents people in need from accessing them. By incorporating AI-driven technology into various components of the design, production, and matching processes, the proposed method aims to make prosthetic limbs affordable without sacrificing functionality. The project will involve a small team of engineers, AI experts, and budget of \$310,000 for research, materials, software, data collection, and other miscellaneous expenses.

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