BitcoinMine: Prototype Report

Introduction

This report outlines the research and design process of BitcoinMine, an iPhone game aiming to highlight the problem of crypto-currency mining's negative environmental impact.

Research Process

Initial research was carried to assess the impact of cryptocurrency mining on the environment. This revealed that cryptocurrency mining, in particular bitcoin, is significantly contributing to the global climate crisis. Bitcoin mining is currently resulting in 130 TWh of energy usage per year (Cambridge Centre for Alternative Finance, 2021). Consequently, mining is as of now responsible for 23 million tons of carbon emissions (Stoll, Klaaßen and Gallersdörfer, 2019), with this expected to rise to 130 million by 2030. (Jiang et al., 2021)

Design Challenge

The research undertaken formed a clear design challenge: highlighting the growing problem of cryptocurrency mining using a significant amount of energy and thus causing carbon emissions which damage the environment.

Design Process

Design Solution

The first stage of the design process was to brainstorm ideas for a solution to the design challenge. The chosen solution was a bitcoin themed mobile game that is aimed at people interested in cryptocurrencies. Whilst the game itself is the main feature of the app, the design brief is met by presenting the user with various pop ups which display facts about cryptocurrency mining's negative impact on the environment after a game, that must be viewed for 10 seconds. A welcome message on the user's first visit to the app is also displayed, informing them of Bitcoin Mine's environmentally motivated goal. The user can stop these pop ups from showing by purchasing BitcoinMine+. However, the user continues to be educated as this purchase unlocks new levels, themed around countries where cryptocurrency mining take place. Every time a user plays a level, they are presented with an opening screen, containing real statistics of that country's mining energy consumption, in addition to a learn more button. Both free and paid users are able to access educational statistics at any point by pressing the green crypto and the environment button on the home screen, which is designed to be an anomaly in the user interface, to attract interaction. This section also allows users to visit EcoCrypto (fictional) that provide more information on the issue and offer potential solutions.

Design Research

Design research was undergone during the design process in order to effectively design the user interface and interaction.

Literature from Alben, Anderson, DiSolvo, Hurff and Norman helped create an effective interactive experience. See here for detailed research.

Several other mobile games were used to form inspiration for the interaction design of the game, see here.

References

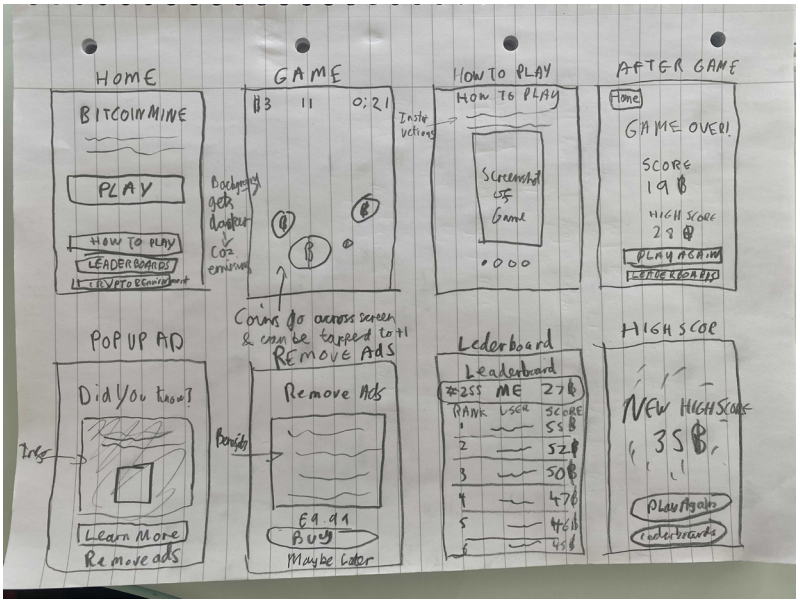
Cambridge Centre for Alternative Finance. (2021). *Cambridge Bitcoin Electricity Consumption Index.* Available from: https://cbeci.org/ [Accessed 27th April 2021]

Jiang, S., Li, Y., Lu, Q., Hong, Y., Guan, D., Xiong, Y. and Wang, S. (2021). *Policy assessments for the carbon emission flows and sustainability of Bitcoin blockchain operation in China.* Nature Communications, 12(1), pp.1-10.

Stoll, C., Klaaßen, L. and Gallersdörfer, U. (2019). *The Carbon Footprint of Bitcoin.* Joule. 3.

Low-fidelity wireframe sketches

Wireframes were sketched out in order to visualise the main screens and user flow of the app.



Branding and style guide

A fun, identifiable and playful brand, appropriate for a game was created. The chosen icon, used for the logo and app icon of the game, is a mining axe, an identifiable and memorable icon that references traditional mining. Machine gunk is a playful and bold font, appropriate for a game. The blue gradient background gives an informal feel to the main UI of the game. A separate, more appropriate style was created for the crypto and the environment section and pop up messages, in order to create a formal feel to and make it more likely the user will take them seriously and be educated.

Main game style guide

Icon

Font

MACHINE GUNK

Colours

Background
#096279 -> #06404F

Primary Action
#FFFFFF

Secondary Action
#000000

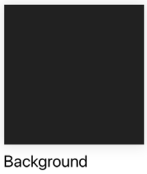
Environment Action
#1B5D23

Environment & Crypto style guide

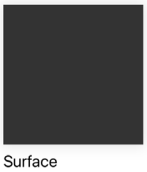
Font

Sf Pro

Colours



Background
#212121



Surface
#333333

Primary Action
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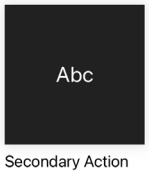
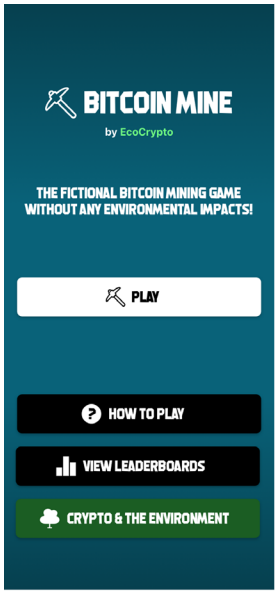


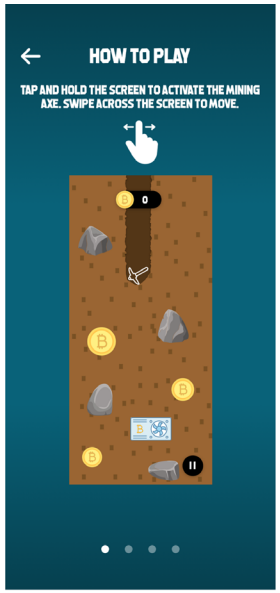
Secondary Action
Text #FFFFFF

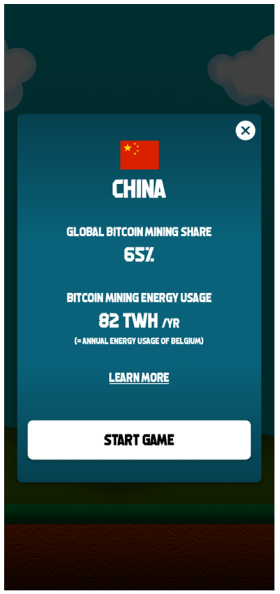
Environment Action
#1B5D23

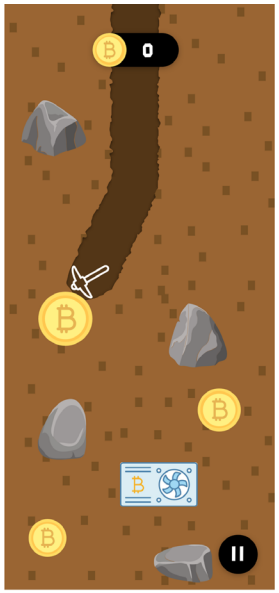
Mid/High Fidelity User Interface Designs

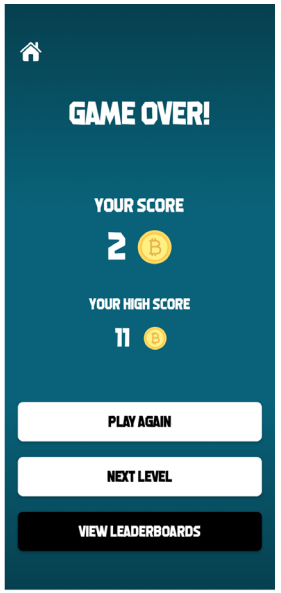
User interface designs, designed using Sketch.

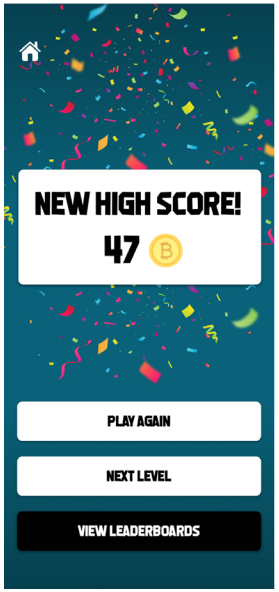


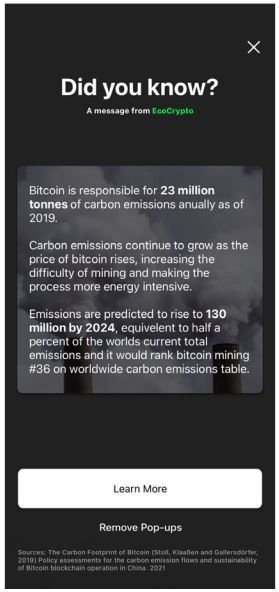


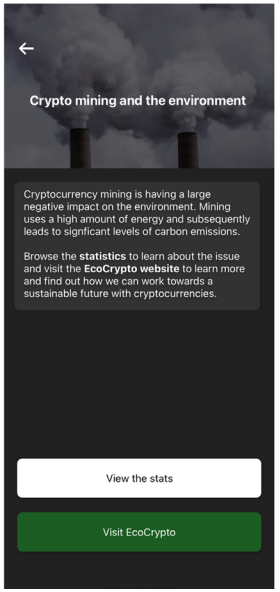






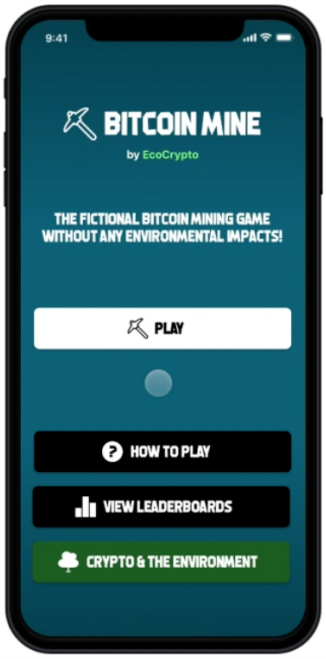






Final Prototype

An interactive clickable protype of the app was built with Invision. This features an animated prototype of the gameplay itself, created with Adobe After Effects. View the video of the prototype in action here and interact with the prototype here.



Conclusion

The protype for Bitcoin Mine demonstrates how a game can attempt to educate users on the problem of bitcoin mining damaging the environment. The next stage for the project would be for it to be developed as an iPhone app, as set out here. Combined with a charity or organisation that offers a solution to the problem (replacing the fictional EcoCrypto in the app), Bitcoin Mine could go some way in resolving this issue that has arisen from society and technology.