SIGNALPOP
UNIVERSAL MINER™

GETTING STARTED

CONTENTS

OVERVIEW

The SignalPop® Universal Miner™ is an application designed to help you mine cryptocurrencies (such as Ethereum) and soon mine artificial intelligence problems using the MyCaffe™ AI Platform (Brown, 2018). MyCaffe was inspired by the original open source C++ Caffe project created by (Jia, et al., 2014) while at Berkeley. For more information on MyCaffe, see us on **GitHub** at http://github.com/mycaffe or **NuGet** at https://www.nuget.org/packages?q=MyCaffe.

When mining with the Universal Miner, there are several important features to be aware of for they will impact the performance and safety of your mining:

- **Settings**; these are the main settings that specify the mining address where you are to be paid, and the name of your mining machine.
- **Hardware**; the hardware settings allow you to monitor the current GPU temperatures and set hardware tuning settings (if your GPU has a configurable fan).
- **Status**; the status shows the standard mining output that you may be familiar with which typically shows the mining progress, etc.

So let's get started, but before we do, please make sure that you are running on a system that meets the minimum requirements listed below.

PRODUCT MINIMUM REQUREMENTS

The SignalPop Universal Miner was built for Windows developers running on either Windows 7 or Windows 10 PC's that have at least one NVIDIA CUDA based GPU installed. With that in mind the minimum requirements for the designer are as follows:

- Operating System: **64-bit Windows 7 or Windows 10**
- System Memory (PC side): **8 GB or more**
- Hard Disk Space: **10 GB free disk space**
- GPU Model: **NVIDIA 1060 or above recommended** (must have CUDA support with compute 3.5 or greater and the latest NVIDIA driver[1])
- GPU Memory: **4 GB** (6 GB or more is recommended)

RECOMMENDED GPUS

As of 7/17/2018, the following GPUs are recommended when using the SignalPop Universal Miner:

- NVIDIA 1080 TI
- NVIDIA 1070 TI
- NVIDIA 1070
- NVIDIA 1060

NVIDIA 20 series GPUS (including 2080 TI) are currently **not recommended** for they lack fan control.

---

[1] To get the latest NVIDIA driver, please see https://www.geforce.com/drivers.

SETUP

Before you start mining, it is important to first change the settings with your mining address and machine name. If you do not change the mining address to your mining address (such as your ETH address) you will not be compensated for your efforts.

SETTING UP THE MINER SETTINGS

The first step when using the SignalPop Universal Miner is to change the settings to your mining settings.
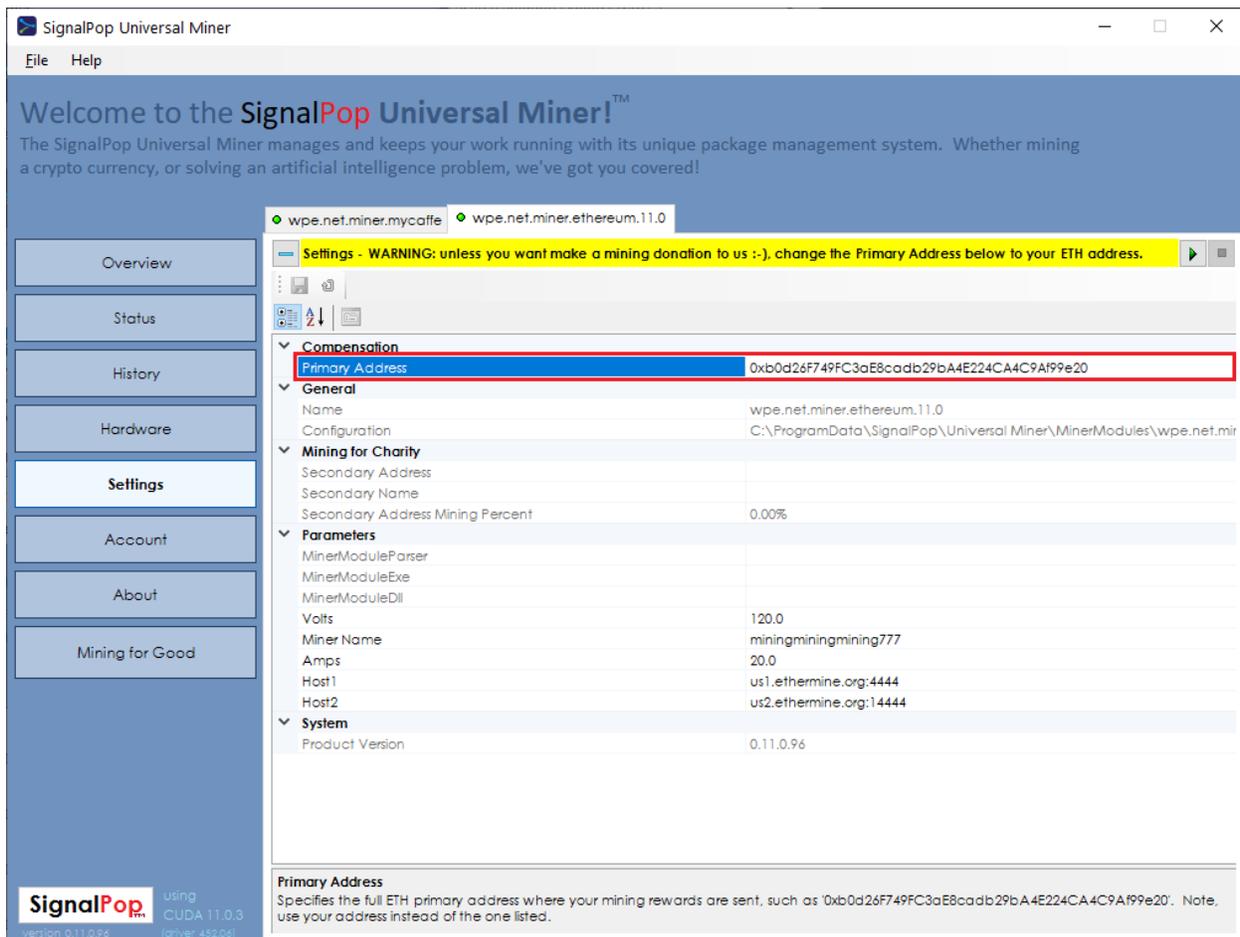
Figure 1 Setting Up

Take the following steps to setup your miner:

1.) Select the 'Settings' button on the left of the Universal Miner.
2.) **Change the 'Primary Address' to your ETH address.**
3.) Change your 'MinerName' to the name that you want to see on ethminer.org for the machine.
4.) Press the 'Save' (🖫) button to save your settings.

SETTING UP THE HARDWARE

After saving your miner settings, you will want to setup the hardware used to mine. To make these changes, select the 'Hardware' button on the left of the Universal Miner.
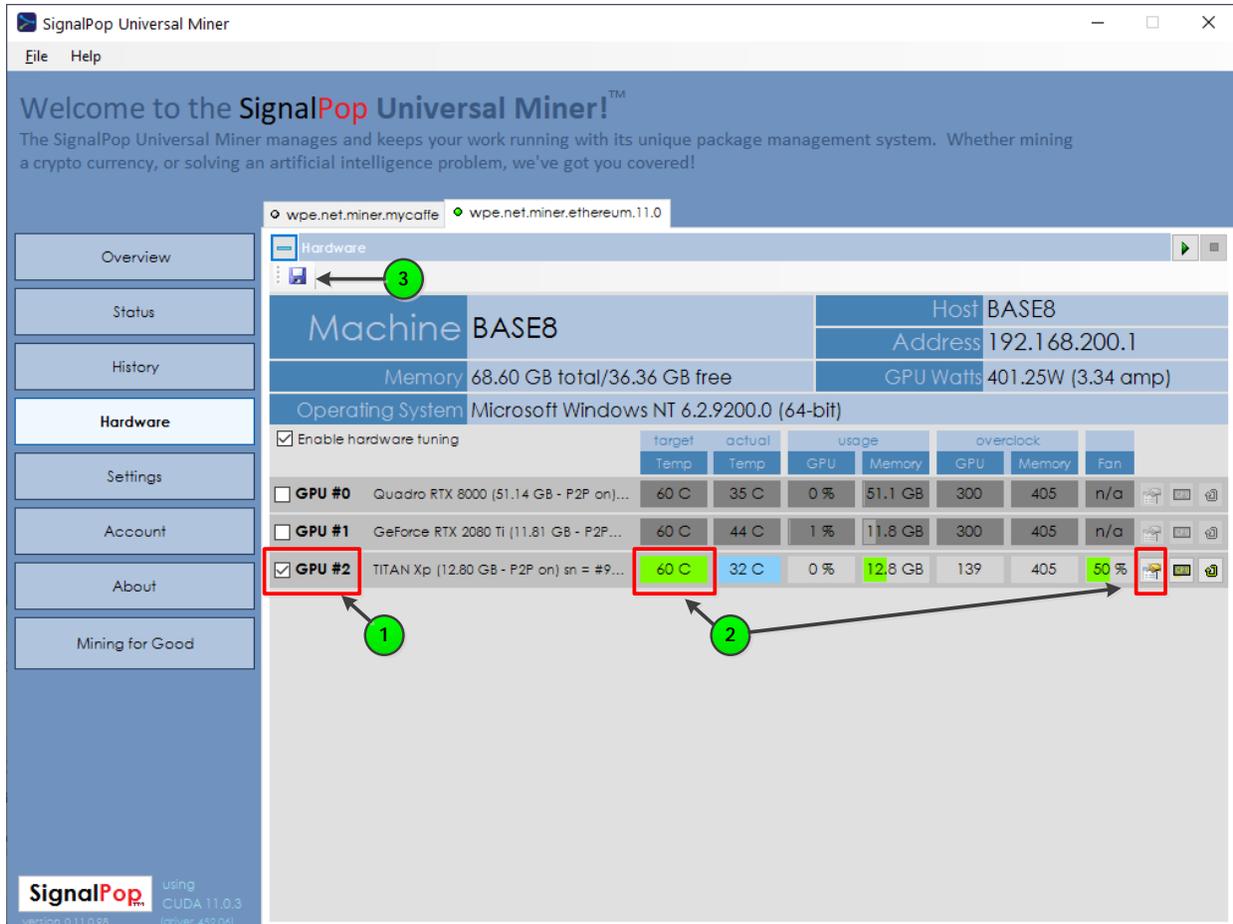
Figure 2 Setting up the Hardware

To set up the hardware, take the following steps.

1.) First select the GPU's to use when mining – you must select at least one.

2.) Next, set your target temperature by selecting the 'Edit' (🖼️) button to set the turning targets for temperature and overclocking offsets.

3.) Save your settings by pressing the 'Save' (💾) button.

Hardware tuning is only provided on GPU's that have configurable fans. When using hardware tuning, set your target temperature to a reasonable, yet safe temperature for your GPU. We have found 60 to 65 degrees Celsius to be good target temperatures. With a setting of 65 degrees Celsius, you may see your GPU temperatures rise above into the 70's Celsius depending on your environment, computer cabinet, etc. However, we do not recommend running your GPU's higher than 75 Celsius for doing so may damage your GPU hardware.

IMPORTANT: When using hardware tuning, initially the hardware tuning searches for the optimal fan rate to keep you temperatures within a 5 degree Celsius band of your target. During this process, you fans will rise up to 100% for a while and then slowly back-off until the optimal fan speed is found for the given temperature. Our hardware turning errors on the side of adding more cooling instead of less for less cooling may cause hardware failure.

OVERCLOCKING

NOTE: Currently overclocking is unavailable, but due to be released in a future release after we complete our testing.

WARNING: When overclocking your GPU(s), you need to be careful for you could void your GPU warranty, damage your GPU, your computer or even worse cause a fire. If you are going to overclock your GPU(s) it is up to you to determine the best overclocking values that do not lead to excessive heat generation in your GPU. Increasing the overclocking will run the GPU at a hotter temperature and may cause it to malfunction.

A new GPU is typically set to its factory-set reference clock speed for both the GPU and the memory. The following are common reference clock speeds that we have seen. All GPU's shown are NVIDIA based GPU's from different card manufacturers:

GPU	GPU Reference Clock	Memory Reference Clock
From NVIDIA - Titan Xp	1835 - 1847 MHz	5508 MHz
From EVGA – 1080 ti	1835 – 1975 MHz	5005 MHz
From EVGA – 1080 ti	1885 MHz	3802 MHz

Keep in mind that these values are not set in stone for one manufacture may ship their GPU's with a different reference clock speed than another – these are just the reference clock speeds that we have seen in our GPUs.

When overclocking, we have found that overclocking the Memory Clock and under-clocking the GPU Clock has the best performance/temperature for mining a cryptocurrency. However, when mining an artificial intelligence problem, we have found that you <u>do not</u> want to under-clock the GPU.

We have found that overclocking the Memory by around 600 Mhz and under-clocking the GPU by 200 Mhz creates a reliable result that does not crash the GPU and maintains a temperature range that can be managed with remaining fan speedup available (e.g. if the fan is running at 70%, a 30% speed-up is available).

IMPORTANT: Even though we have seen positive results with these speed-ups, we have had a few Gigabyte 1070 GPU's fail using these settings and our ambient temperature environment may be very different from yours. If you live in an area with a relatively warm ambient temperature (80 degrees Fahrenheit or more) you may not be able to overclock at all. The reading to watch very closely when overclocking is your **actual GPU temperature**. We do not recommend overclocking <u>at all</u> if you're actual GPU temperature is at or rises above 65 degrees Celsius. When enabling the overclock tuning, we

recommend that you set your target temperature to a value of 65 degrees Celsius or less for we will not overclock if the actual temperature rises above the target temperature + 5 degrees Celsius.

START MINING

To start mining, just select the 'Start' (▶) button in the upper right corner of any window. To stop, just press the 'Stop' (■) button.
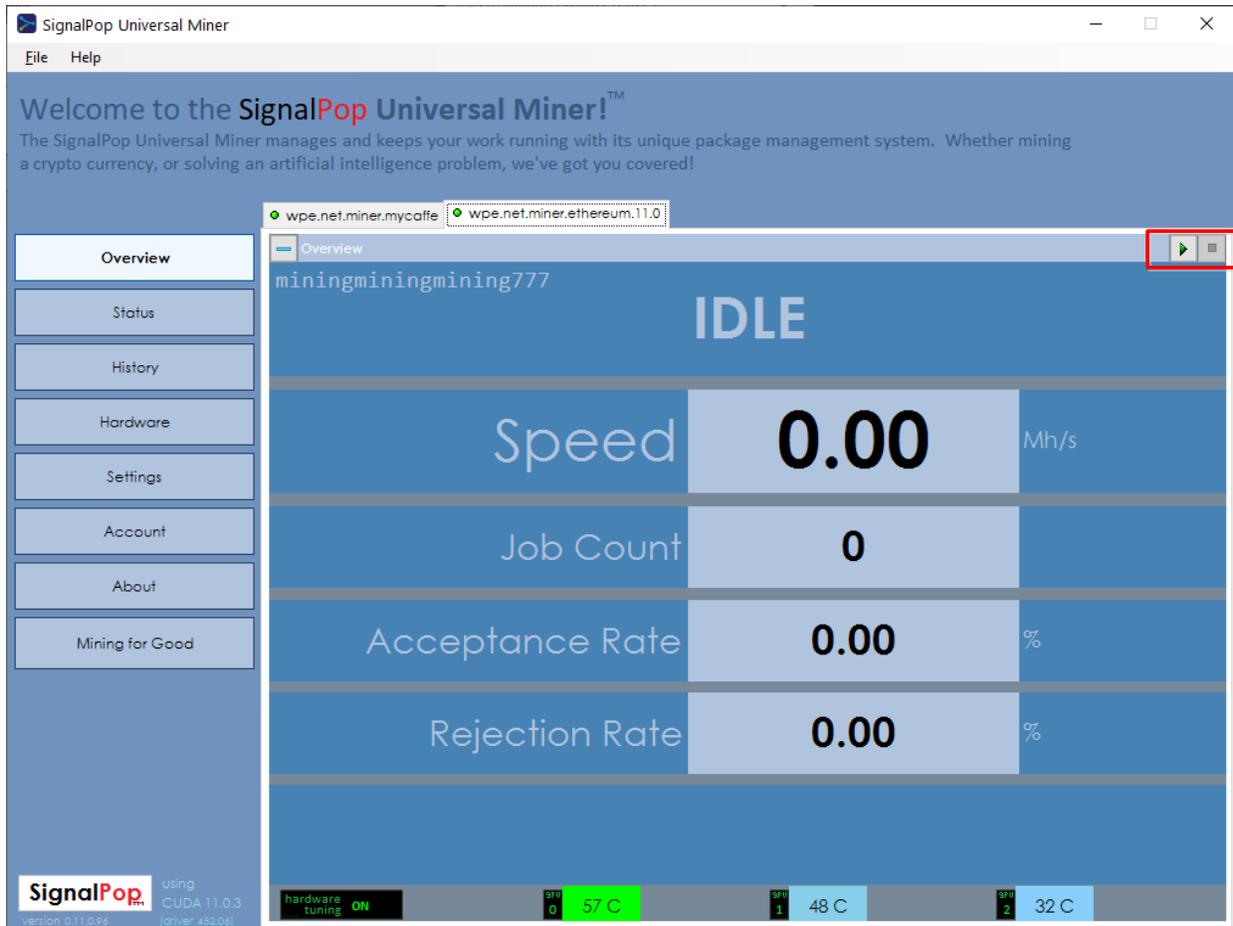
Figure 3 Starting and Stopping Mining

Once started, the status will change from 'IDLE' to 'RUNNING' and after an initial startup period you will see your 'Speed' Mh/s increase.

When mining, by far, the most important information to watch are the actual temperatures of your GPU's. Ideally your GPU temperatures should not exceed 75 degrees Celsius. If you live in a cold environment this should not be a problem.

However, if you are located in a warmer climate where the ambient temperature is 26.2 Celsius (80 F) or higher, maintaining the 75 degrees Celsius may be a challenge. During such times, you will want to increase the ambient cooling around your mining machines or not mine at all for unfortunately there is only so much the GPU fans can do.
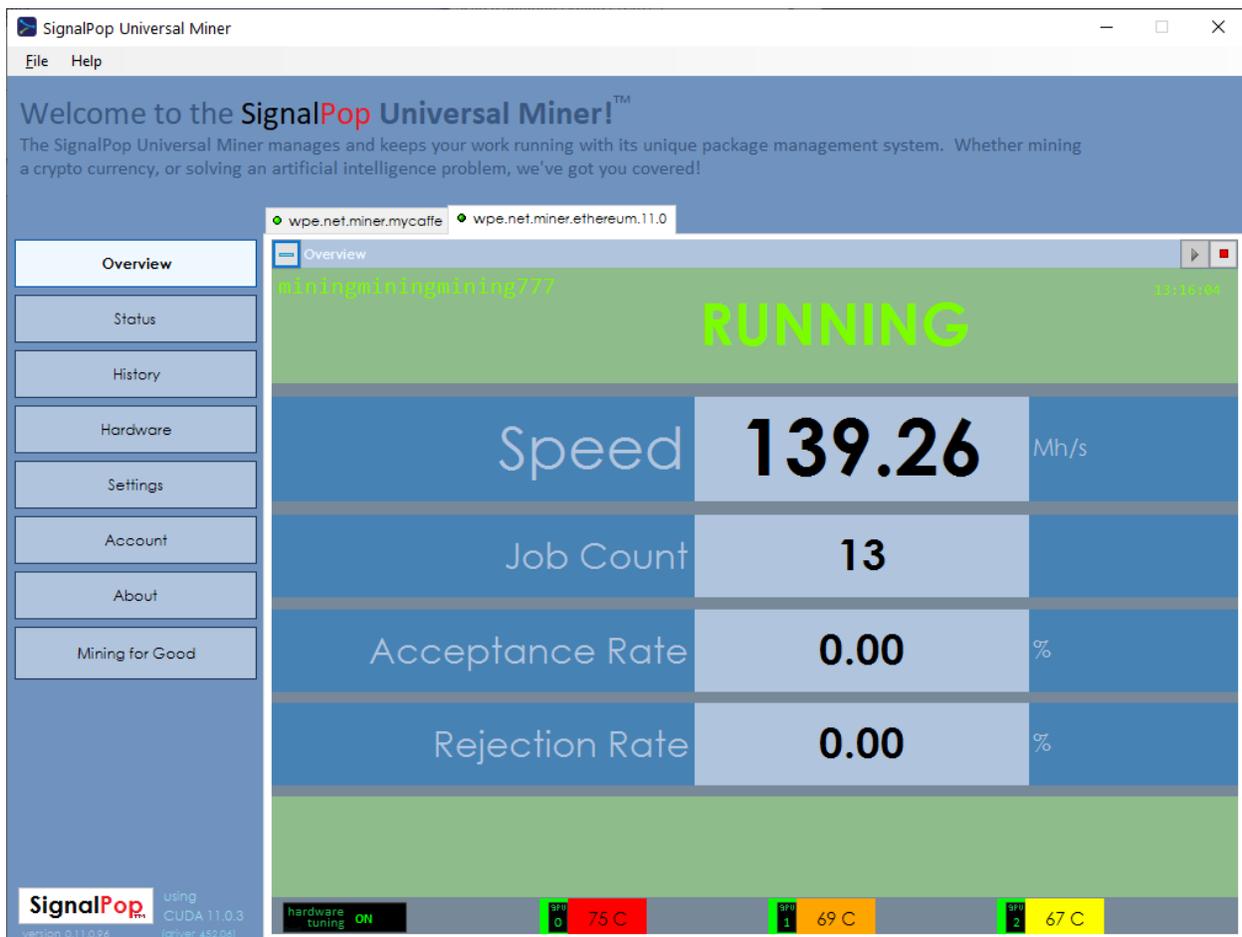
Figure 4 Active Mining Overview

The current temperature of each GPU is displayed along the bottom of the 'Overview window and also in the 'Hardware' window.
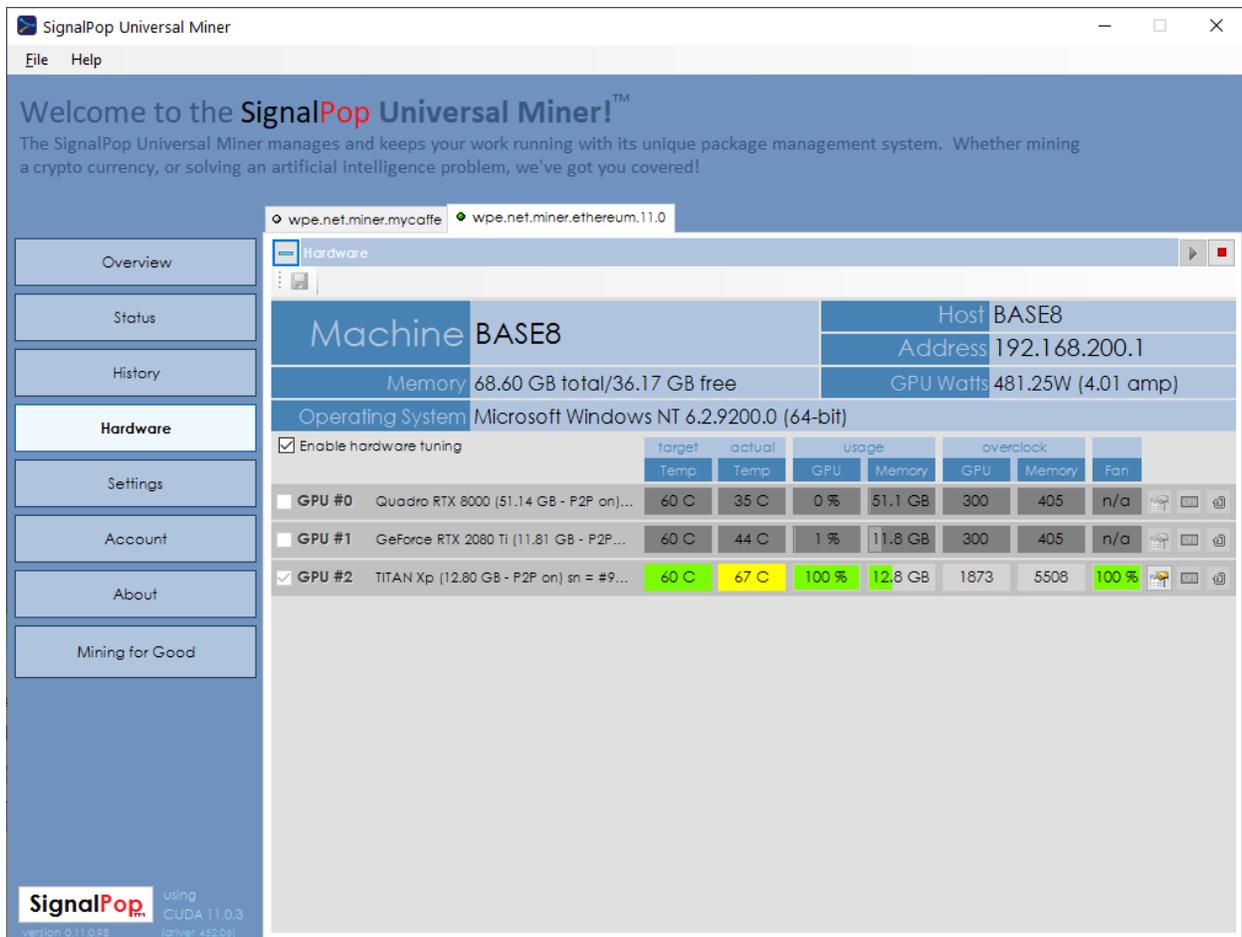
Figure 5 Active Mining Hardware

The 'Hardware' window shows additional information such as your temperatures for each GPU (when using hardware tuning), the current GPU usage, GPU memory, GPU clock, Memory clock and Fan usage.

NOTE: Only GPU's that offer configurable fans support hardware tuning.

Once you are happy with how your hardware is configured and performing, you may want to see how well your mining rig performs over time.

There are two aspects to mining profitability:

a.) your average hashes/second (e.g. Mh/s) and,
b.) your overall up-time.

You may have the fastest machine in the world, but if it does not have a very good up-time your overall profitability will be poor.
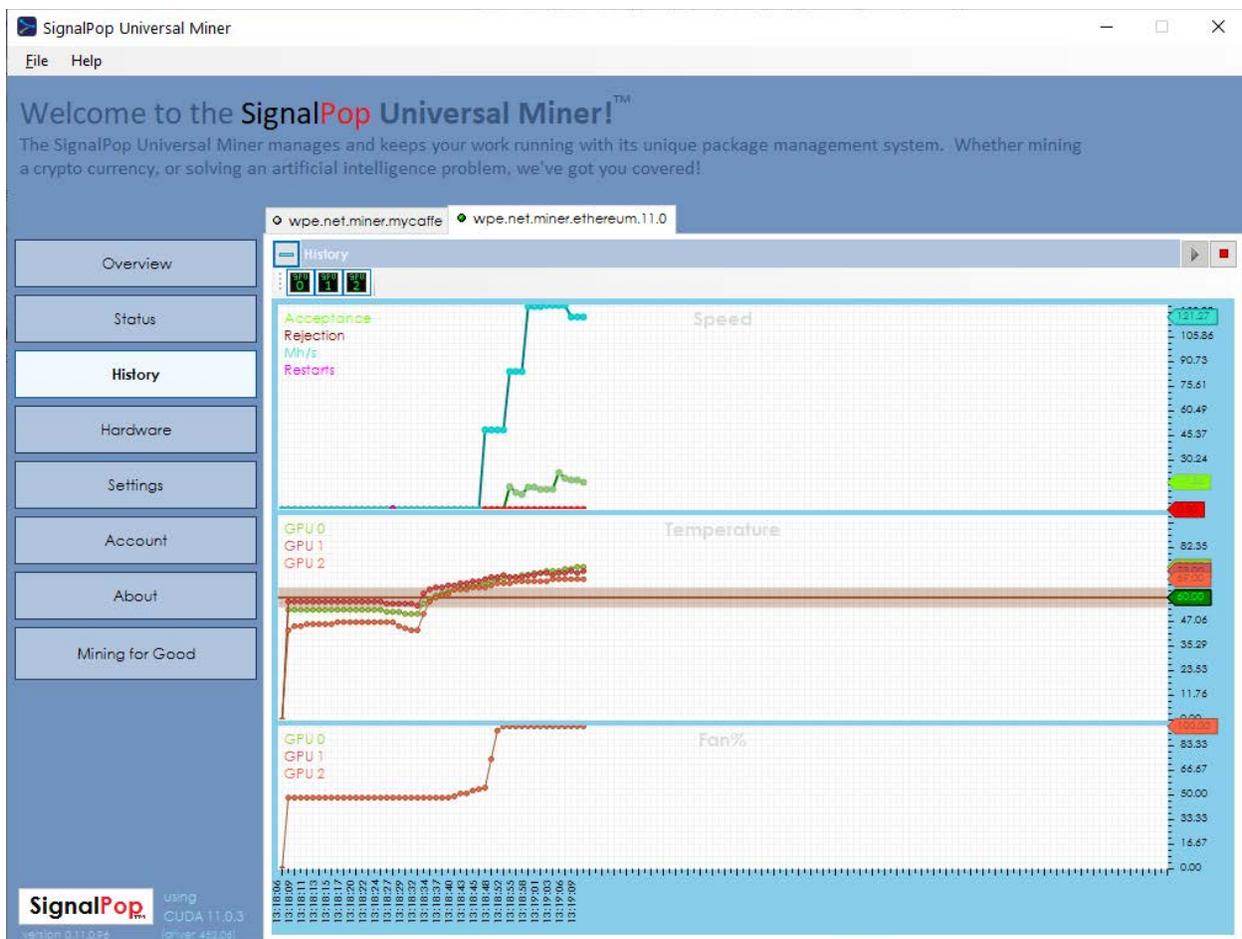
The 'History' window shows how well your mining rig performs on a hashes/second basis. In addition, the % of Mh/s that were used on 'accepted' solutions is shown in green along with the % of Mh/s that were rejected.

To view your overall performance, select the 'Account' button which will bring up your account on www.ethermine.org.

While mining, you may want to give a portion of your mining time to a charity. To do so, select the 'Mining for Charity' button to display the 'Mining for Charity' screen.
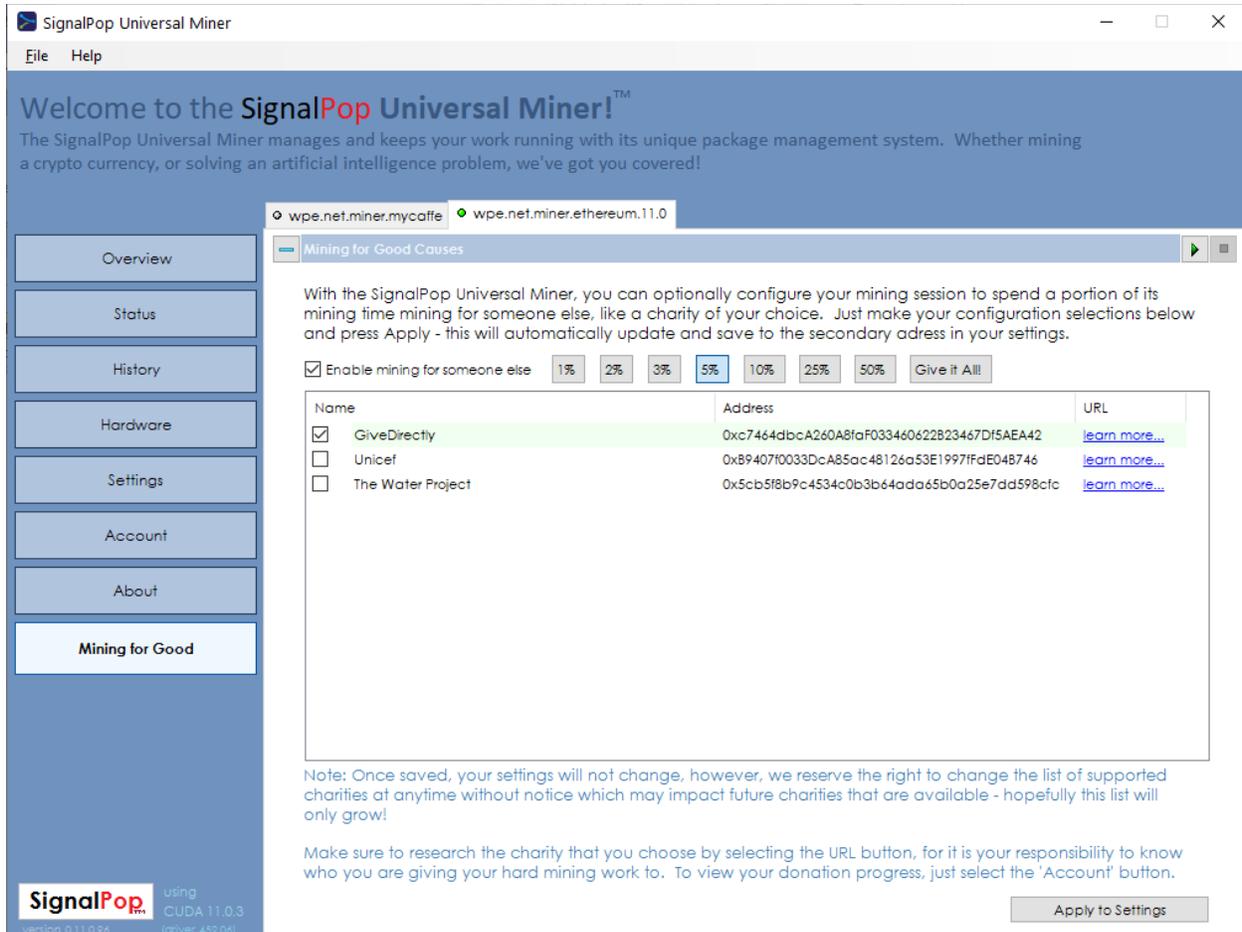
Figure 6 Mining for Charity View

Selecting the 'Apply to Settings' button directly saves the mining for charity settings to your general settings as shown below.

When mining for charity, we use a similar method of time allocation as is used to pay the developer fee in that we mine for the percentage of the day that you specified (e.g. the 'Secondary Address Mining Percent') with the 'Secondary Address' which in this case is the Ethereum address used by the GiveDirectly charity. For more information on GiveDirectly select the 'URL' on the screen, or go to https://givedirectly.org/.

The SignalPop Universal Miner™ now supports *mining AI* work packages via the **wpe.net.miner.mycaffe** miner! Mining AI is the process of training a work package delegated to the miner from the Scheduling database.
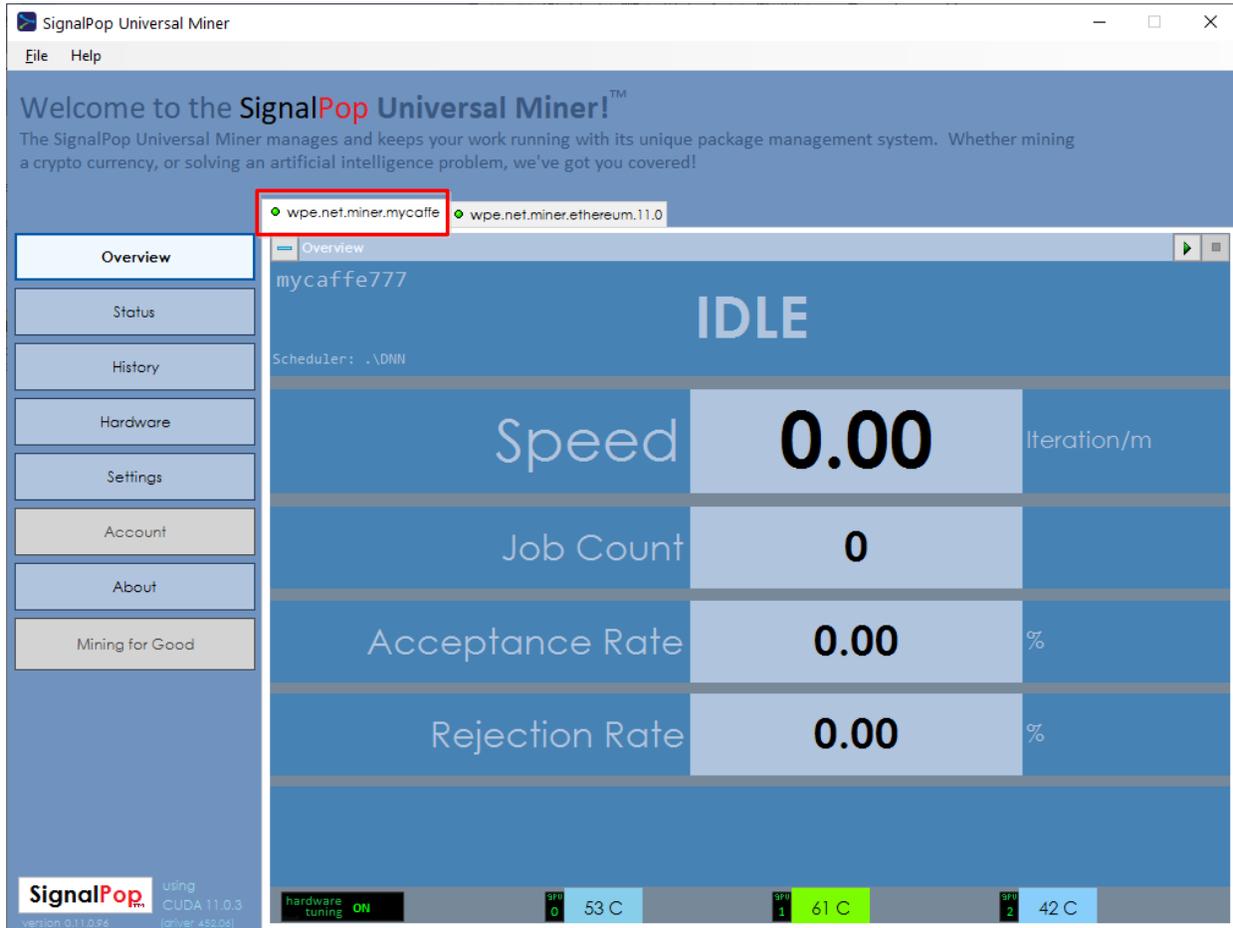
Figure 7 Mining MyCaffe AI

Mining AI is the same as mining Ethereum except when mining AI the speed is measured in iterations per minute instead of mega-hashes per second. In addition, each AI Job represents a project that is trained vs an Ethereum transaction that is verified when mining Ethereum.

AI mining jobs are delegated via the *Scheduler* which may reside locally, on a local network. The '*Scheduler:*' field in the *Overview* screen shows which scheduler is in use.

NOTE: when mining AI, the *Account* and *Mining for Good* windows are not available.

When mining AI, the settings are a little different from those used when mining Ethereum.
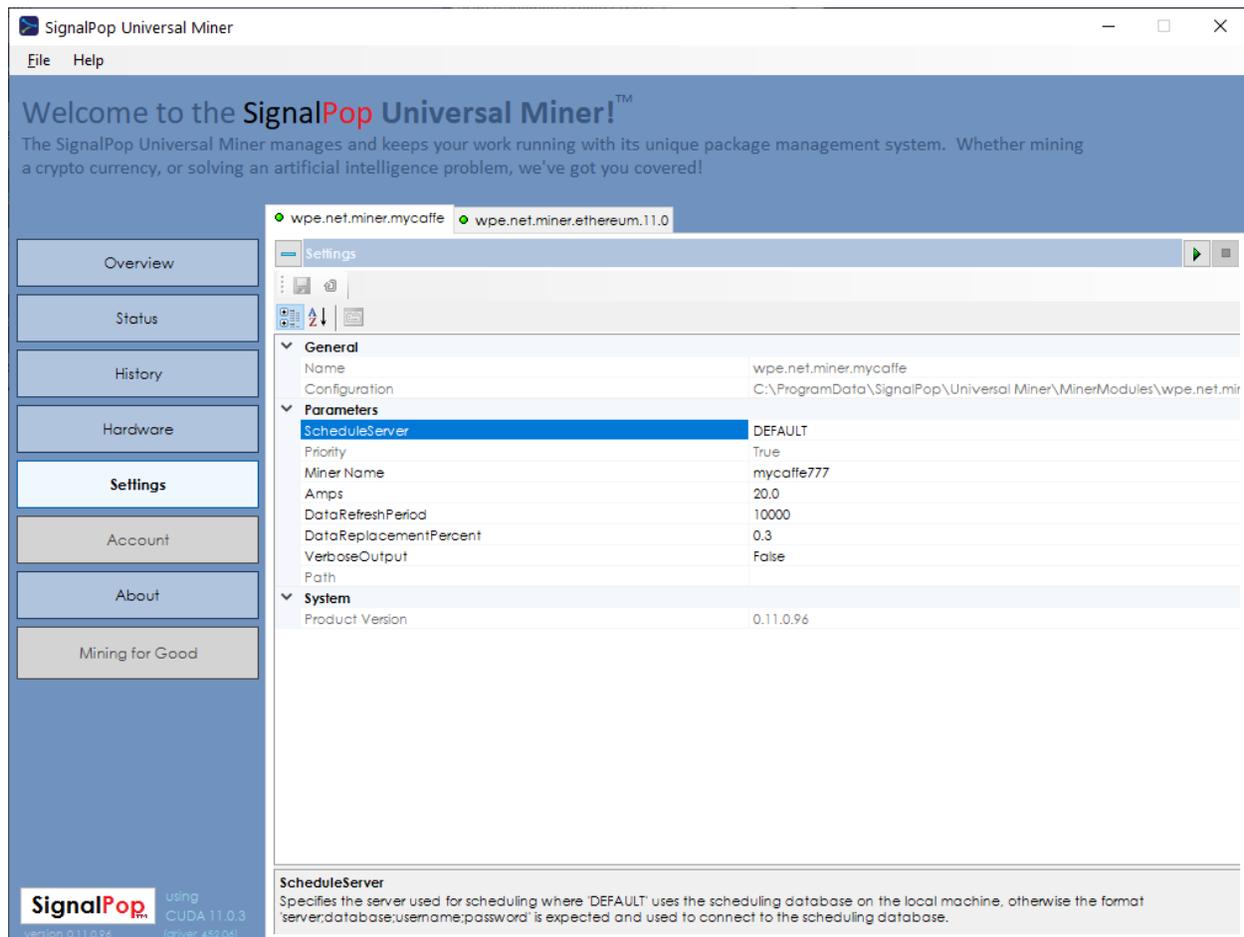
Figure 8 Mining AI Settings

There are two settings that are specific to AI Mining:

ScheduleServer; the schedule server defines where AI work packages are delegated from. This setting is ether 'DEFAULT' for the local machine database (if running on a machine where the SignalPop AI Designer is also installed), or **server;database;username;password** which specifies to use a specific database server (encrypted on save).

VerboseOutput; when True, the verbose output directs a details status output to the Status window. Otherwise, when False, a more simple output is used.

13

SIGNALPOP PRODUCTS

At SignalPop, we strive to create innovative products that help solve difficult problems. The following products are offered by SignalPop.

MyCaffe AI Platform; the MyCaffe AI Platform was inspired by the original open source C++ Caffe project created by (Jia, et al., 2014) while at Berkeley. For more information on MyCaffe, see us on **GitHub** at http://github.com/mycaffe or **NuGet** at https://www.nuget.org/packages?q=MyCaffe. Using MyCaffe you can easily create complex, deep learning models to solve difficult artificial intelligence problems.

SignalPop AI Designer; designed specifically for the MyCaffe AI Platform, the SignalPop AI Designer allows you to visually develop, test and debug complex deep learning models such as ResNet, DANN, AlexNet, GoogleNet and VGG.

SignalPop Universal Miner; designed to mine anything from a cryptocurrency to an artificial intelligence problem, and do so 24/7.

For more information on our products see https://www.signalpop.com.

REFERENCES

Brown, D. W. (2018, October 4). *MyCaffe: A Complete C# Re-Write of Caffe with Reinforcement Learning.* (Cornell University) Retrieved from https://arxiv.org/abs/1810.02272

Jia, Y., Shelhamer, E., Donahue, J., Karayev, S., Long, J., Girshick, R., . . . Darrell, T. (2014, June 20). *Caffe: Convolutional Architecture for Fast Feature Embedding.* Retrieved from https://arxiv.org/abs/1408.5093